SDS1101/2101
User Guide

Part Number 900-451
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Disclaimer

Operation of this equipment in a residential area is likely to cause interference in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

Note: *This product has been designed to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against such interference when operating in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this guide, may cause harmful interference to radio communications.*

Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device.

The information in this guide may change without notice. The manufacturer assumes no responsibility for any errors that may appear in this guide.

Note: *Export Control Classification Number 5A002, License exception ENC. The following export agreement is required for encryption:*

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Revisions

Date	Rev.	Comments
8/06	A	Initial document
1/09	B	Include SDS2101 product; updated to firmware v6.5.0.0
2/10	C	Update document with corrections.

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1: Using This Guide

Purpose and Audience

This guide provides the information needed to configure, use, and update the SDS1101 & SDS2101 device servers. It is for system administrators and those responsible for installing and maintaining the SDS.

Chapter Summary

The remaining chapters in this guide include:

2: Introduction	Describes the main features of the SDS and the protocols it supports.
3: Getting Started	Provides information for installing your unit and getting it up and running using DeviceInstaller or a serial port connection.
4: Configuration Using Web-Manager	Details using the Web-Manager to set parameters such as port and server properties.
5: Configuration via Telnet or Serial Port (Setup Mode)	Provides instructions for accessing Setup Mode (command line interface) using a Telnet connection through the network or a terminal or terminal emulation program through the serial port.
6: Setup Mode: Server Configuration	Details the network (server) settings
7: Setup Mode: Channel Configuration	Details the serial port settings.
8: Setup Mode: Advanced Settings	Details expert and security settings and explains how to reset the unit to factory default values.
9: Firmware Upgrades	Provides instructions for obtaining the latest firmware and updating the SDS.
10: Monitor Mode	Provides instructions for accessing and using the command line interface to monitor the network and diagnose problems.
11: Troubleshooting and Contact Information	Describes common problems and error messages and how to contact Lantronix Technical Support.
12: SDS1101 Connections and Pinouts	Provides descriptions and illustrations of connection hardware.
13: SDS2101 Connections and Pinouts	Provides descriptions and illustrations of connection hardware.
14: SDS1101 Technical Specifications	Lists technical specifications for the SDS1101.

15: SDS2101 Technical Specifications	Lists technical specifications for the SDS2101.
A: Alternative Ways to Assign an IP Address	Provides detailed information about using DHCP, AutoIP, BOOTP ARP, and Telnet to assign an IP address.
B: Binary to Hexadecimal Conversions	Provides instructions for converting binary values to hexadecimals.

Additional Documentation

Visit the Lantronix web site at www.lantronix.com/support/documentation for the latest documentation and the following additional documentation:

SDS1101 & SDS2101 Quick Start	Provides the steps for getting the SDS1101/2101 up and running.
DeviceInstaller Online Help	Provides instructions for using the Windows-based utility to configure the SDS1101/2101 and other Lantronix device servers.
Com Port Redirector User Guide	Provides information on using the Windows-based utility to create a virtual com port.

2: Introduction

The SDS1101 is a single-port device server and the SDS2101 is a dual port device server that provide a quick, simple, and cost-effective way to bring the advantages of data accessibility and remote management to devices not currently connected to a network.

Applications

The SDS family of Device Servers allows serial devices, such as those listed below, to connect and communicate over Ethernet networks using the IP protocol family (TCP for connection-oriented stream applications and UDP for datagram applications).

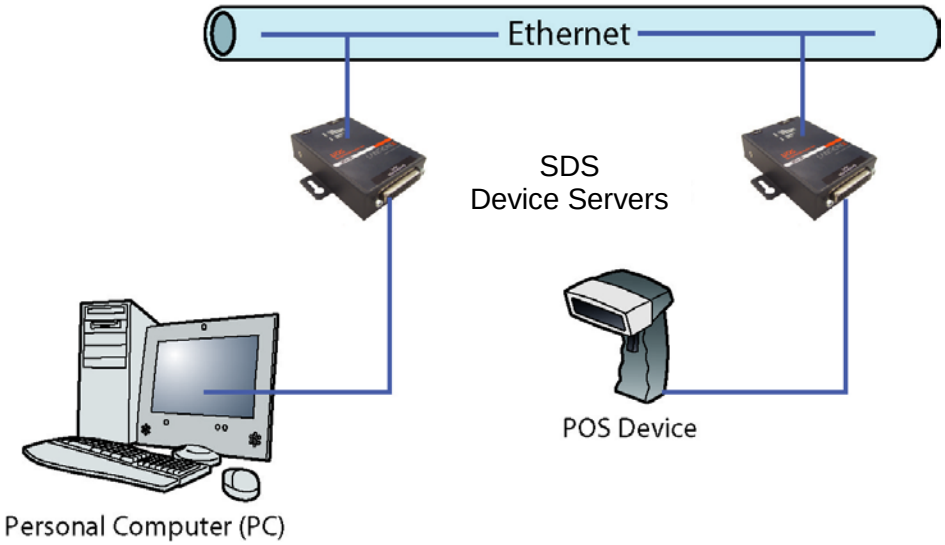
The SDS1100/2101 Secure Device Server offers secure data communications using Rijndael Advanced Encryption Standards (AES) and is certified by the National Institute of Standard and Technology (NIST) to meet Federal Information Processing Standards (FIPS) required for data communication on US government and government contractor's networks.

- Security alarms
- Access control devices
- Fire control panels
- Time/attendance clocks and terminals
- ATM machines
- Data collection devices
- RFID readers
- Universal Power Supply (UPS) management units
- Telecommunications equipment
- Data display devices
- Virtually any asynchronous RS-232, RS422, or RS485 device

Application Examples

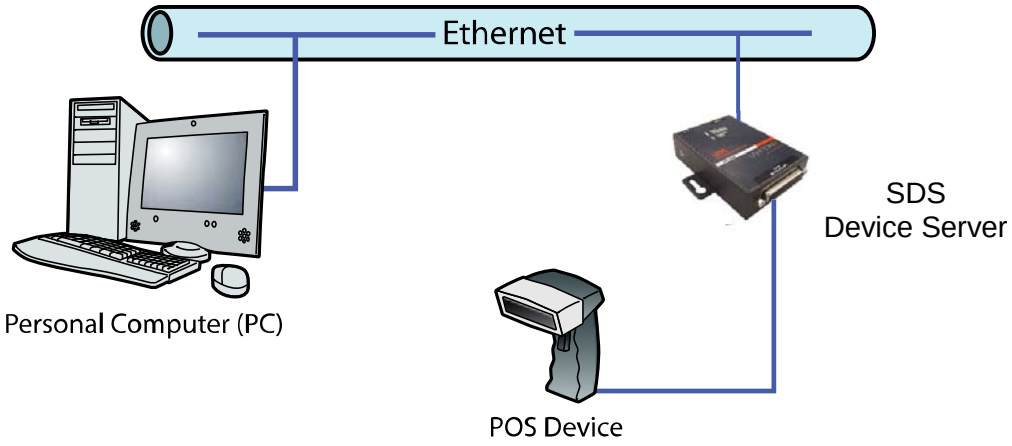
Using a method called serial tunneling, the SDS encapsulates serial data into packets and transports them over Ethernet. Using two SDS units, connected by a network, virtual serial connections can extend across a facility or around the world.

Figure 2-1. Serial Tunneling Example



The Com Port Redirector software included on the product CD simplifies the integration process by extending the functionality of COM-port-based Windows™ applications. Virtual COM ports, mapped to remote device servers on the network, can replace direct serial connections.

Figure 2-2. Direct TCP/IP or Redirector Configuration



Note: *For step-by-step instructions on configuring the SDS for serial tunneling or for use with the Com Port Redirector, see SDS Configuration Tutorials on the Lantronix web site: www.lantronix.com/support.*

Protocol Support

The SDS uses the Internet Protocol (IP) for network communications and the Transmission Control Protocol (TCP) to assure that no data is lost or duplicated and that everything sent to the connection arrives correctly at the target.

Supported protocols include:

- ARP, UDP, TCP, ICMP, Telnet, TFTP, AutoIP, DHCP, HTTP, and SNMP for network communications.
- TCP, UDP, and Telnet for connections to the serial port.
- TFTP for firmware updates.
- IP for addressing, routing, and data block handling over the network.
- User Datagram Protocol (UDP) for typical datagram applications in which devices interact with other devices without a point-to-point connection.

Additional Features

Modem Emulation: In modem emulation mode, the SDS can replace dial-up modems. The unit accepts modem AT commands on the serial port and then establishes a network connection to the end device. This arrangement leverages network connections and bandwidth to eliminate dedicated modems and phone lines.

Built-in Web Server: The SDS includes a built-in web server for configuring the unit and displaying operating and troubleshooting information on the attached links to online support.

Configuration Methods

After installation, the SDS requires configuration. For the unit to operate correctly on a network, it must have a unique IP address on the network. There are three basic methods for logging into the SDS and assigning IP addresses and other configurable settings:

DeviceInstaller: Configure the IP address and other network settings on the SDS using a Graphical User Interface (GUI) on a PC attached to a network. (See *Assigning the IP Address: DeviceInstaller*)

Web-Manager: Through a web browser, configure the SDS settings using the Lantronix Web-Manager. (See *4: Configuration Using Web-Manager*.)

Serial and Telnet Ports: Use Setup Mode, a command line interface. There are two approaches to accessing Setup Mode: making a Telnet connection to the network port (9999) or connecting a terminal (or a PC running a terminal emulation program) to the unit's serial port. (See *5: Configuration via Telnet or Serial Port (Setup Mode).*

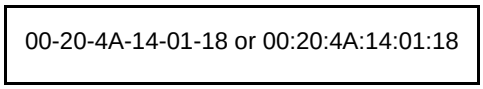
Product Information Label

The product information label on the underside of the unit contains the following information about your specific unit:

- Bar code
- Serial number
- Product ID (name)
- Product description
- Hardware address (also referred to as the Ethernet or MAC address)

The first three bytes of the hardware address are fixed and read 00-20-4A, identifying the unit as a Lantronix product. The fourth, fifth, and sixth bytes are unique numbers assigned to each unit.

Figure 2-3. Sample Hardware Address



3: Getting Started

This chapter describes how to get your SDS up and running in the shortest possible time.

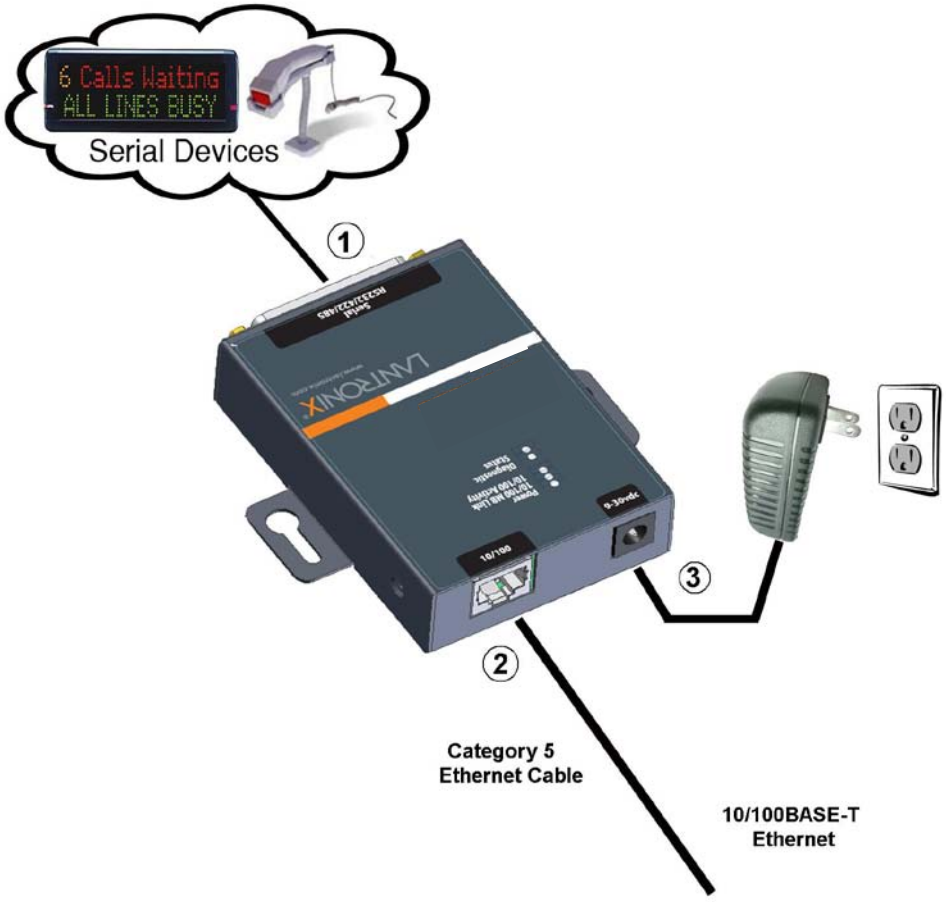
Package Contents

Verify and inspect the contents of the SDS1101/2101 package using the following list. If any item is missing or damaged, contact your place of purchase immediately.

- SDS1101 or SDS2101
- Six-foot DB9F-to-DB25M modem cable (SDS1101) or DB9F to DB9F Null Modem Cable (SDS2101)
- Power supply
- CD with documentation and software utilities
- Fastening kit
- Quick Start Guide

Installing the SDS

Figure 3-1. SDS1101 Connected to Serial Device and Network



To install the unit:

Complete the following steps in order. Refer to the numbers in the figure above.

Note: *See the sections that follow for details about connectors and pinouts.*

1. Connect a serial device to your unit.
2. Connect an Ethernet cable to the RJ45 port.
3. Supply power to your unit using the power supply that was included in the packaging.

   Note: *The required input voltage is 9-30 VDC (center +) or 10-24 VAC (1.5W maximum power required).*

4. Supply power to the serial device.

Note: *If you encounter a problem, please see LEDs for diagnostic information.*

Required Information

Before configuring the SDS, have the following information available:

Hardware Address

Take note of the unit's hardware address (also known as the Ethernet or MAC address). It is on the product label, in the format: 00-20-4a-XX-XX-XX, where the XXs are unique numbers assigned to the product (see *Product Information Label*).

Hardware Address: **00-20-4a-_____-_____-_____**

IP Address

The SDS must have a unique IP address on your network. This address references the specific unit. By default, the unit is DHCP-enabled and automatically assigned an IP address on DHCP-enabled networks. If you are assigning a static IP address, the systems administrator generally provides the IP address, subnet mask, and gateway.

Note: *The factory default IP address is 0.0.0.0 to enable DHCP, BOOTP, and AutoIP. When the units boots, it sends a DHCP broadcast to try and get an IP address. If it receives no reply from a DHCP server, the SDS tries BOOTP. If the SDS does not receive a response from BOOTP, it reverts to an AutoIP address.*

IP Address: _____ _____ _____ _____

Subnet Mask: _____ _____ _____ _____

Gateway: _____ _____ _____ _____

You have several options for assigning an IP address and related network settings to your unit. This chapter provides information about using the DeviceInstaller (graphical user interface) and serial port login (command line interface) methods.

Note: *For information about other methods of assigning the IP address, such as DHCP, AutoIP, ARP, and Telnet, see Alternative Ways to Assign an IP Address.*

Assigning the IP Address: DeviceInstaller

This chapter covers the steps for getting the SDS1101/2101 device server online and for viewing its current configuration.

Note: *DeviceInstaller online Help provides more detailed information on using DeviceInstaller.*

Installing DeviceInstaller

To use the DeviceInstaller utility, first install it from the product CD.

1. Insert the product CD into your CD-ROM drive. The Lantronix DeviceInstaller window displays.
2. If the CD does **not** launch automatically:
   a) Click the **Start** button on the Task Bar and select **Run**.
   b) Enter your CD drive letter, colon, backslash, **Launch.exe** (e.g., **D:\Launch.exe**).
3. Click the **DeviceInstaller** button.
4. Respond to the installation wizard prompts.

Assigning an IP Address

The unit's IP address must be configured before it can work correctly on a network. The unit's IP address is normally set to 0.0.0.0 at the factory. The hardware address is on the product label. The unit is DHCP enabled as the default.

To assign an IP address manually:

1. Click **Start→Programs → Lantronix→DeviceInstaller→DeviceInstaller.** If your PC has more than one network adapter, a message displays. Select an adapter and click **OK**.

   Note: *If the unit already has an IP address (e.g., DHCP has assigned an IP address), click the* ***Search*** *icon* *and select the unit from the list of Lantronix device servers on the local network.*

2. Click the **Assign IP** icon .
3. If prompted, enter the hardware address (on the product label) and click **Next**.
4. Select **Assign a specific IP address** and click **Next**.
5. Enter the **IP address**. The **Subnet mask** displays automatically based on the IP address; if desired, you may change it. On a local network, you can leave the **Default gateway** blank (all zeros). Click **Next**.
6. Click the **Assign** button and wait several seconds until a confirmation message displays. Click **Finish**.

7. Select the device from the main window list and select **Ping** from the **Tools** menu. The Ping Device dialog box shows the IP address of the selected unit.

8. From the **Tools** menu, click the **Ping** button. The results display in the Status window. Click the **Clear Status** button to clear the window so you can ping the device again.

   Note: *If you do not receive "Reply" messages, make sure the unit is attached to the network properly and the IP address assigned is valid for the particular network segment you are working with. If you are not sure, check with your systems administrator.*

9. Click the **Close** button to close the dialog box and return to the main window.

Adding the Unit to the Manage List

Now add the unit to the list of similar Lantronix devices on the network so you can manage and configure it. To perform this step, click the **Search** icon

DeviceInstaller locates the unit and adds it to the list. Now you can manage (configure) the unit so it works with the serial device on the network.

Accessing the SDS1101/2101 Using DeviceInstaller

1. Click **Start→Programs → Lantronix→DeviceInstaller→DeviceInstaller.**

2. Click the SDS folder. The list of available Lantronix SDS1101 & SDS2101 devices displays.

3. Expand the list of SDS1101s or SDS2101s by clicking the **+** symbol next to the SDS1101 or SDS2101 icon. Select the SDS unit by clicking on its IP address to view its configuration.

Viewing the Current Configuration

DeviceInstaller provides a view of the unit's configuration.

To view the unit's current settings:

1. Follow the instructions above to locate the SDS1101 or SDS2101.

2. In the right pane, click the **Device Details** tab. The current SDS1101/2101 configuration displays:

Name	Configurable field. A name that identifies the SDS. Double-click the field, type in the value, and press Enter to complete. This name is not visible on other PCs or laptops using DeviceInstaller.
Group	Configurable field. A group name to categorize the SDS. Double-click the field, type in the value, and press Enter to complete. This group name is not visible on other PCs or laptops using DeviceInstaller.
Comments	Configurable field. Information about the SDS. Double-click the field, type in the value, and press Enter to complete. This description or comment is not visible on other PCs or laptops using DeviceInstaller.

Device Family	Non-configurable field. Displays the SDS1101's and SDS2101's device family type as SDS.
Type	Non-configurable field. Displays the device type as SDS1101 or SDS2101.
ID	Non-configurable field. Displays the SDS's ID embedded within the box.
Hardware Address	Non-configurable field. Displays the SDS's hardware (or MAC) address.
Firmware Version	Non-configurable field. Displays the firmware currently installed on the SDS.
Extended Firmware Version	Non-configurable field. Displays the full version nomenclature of the firmware.
Online Status	Non-configurable field. Displays the SDS status as online, offline, unreachable (the SDS is on a different subnet), or busy (the SDS is currently performing a task).
IP Address	Non-configurable field. Displays the SDS's current IP address. To change the IP address, see *Assigning an IP Address*
IP Address was obtained	Statically
Subnet Mask	Non-configurable field. Displays the SDS's current subnet mask. To change the subnet mask, see *Assigning an IP Address*.
Gateway	Non-configurable field. Displays the SDS's current gateway. To change the gateway, see *Assigning an IP Address*.
Number of COB partitions supported	Non-configurable field. Displays the number of COB partitions supported.
Number of Ports	Non-configurable field. Displays the number of ports on the SDS.
TCP Keepalive	Non-configurable field. Displays the SDS's TCP keepalive value. The value is in the range 1-65s, and the default setting is 45.
Telnet Enabled	Non-configurable field. Permits Telnet sessions.
Telnet Port	Non-configurable field. Displays the SDS port for telnet sessions.
Web Enabled	Non-configurable field. Permits configuration through Web-Manager.
Web Port	Non-configurable field. Displays the SDS port for Web-Manager configuration.
Maximum Baud Rate Supported	Non-configurable field. Displays the SDS's maximum baud rate. ***Note:*** *The SDS1101/2101 may not currently be running at this rate*.
Firmware Upgradeable	Non-configurable field. Displays **True**, indicating the SDS's firmware is upgradeable as newer version become available.
Supports Configurable Pins	Non-configurable field. Displays **False**.

Supports Email Triggers	Non-configurable field. Displays **False**.
Supports AES Data Stream	Non-configurable field. Displays **True**.
Supports 485	Non-configurable field. Displays **True**. The SDS supports the RS-485 protocol.
Supports 920K Baudrate	Non-configurable field. Displays **False for SDS1101** which supports baud rates up to 230400. Displays **True for SDS2101** which supports a baud rate of 921600.
Supports HTTP Server	Non-configurable field. Displays **True**.
Supports HTTP Setup	Non-configurable field. Displays **True**.
Supports 230K Baud Rate	Non-configurable field. Displays **True**. SDS supports a baud rate of 230400.
Supports GPIO	Non-configurable field. Displays **False**.

Next Step

Now that the SDS has an IP address and other initial settings, you can configure it. You have the following options:

To configure the unit using a Web browser:

1. Click the Web Configuration tab.
2. Do one of the following:
   - To view the Web Manager in the current DeviceInstaller window, click the **Go** button.
   - To open the Web Manager in a web browser, click the **External Browser** button.

   The Web Manager displays. A user and password dialog box displays.
3. By default, no user and password are configured, so just press **OK**.
4. Continue with *4: Configuration Using Web-Manager*.

   Note: *To assign Security settings, you must use the Setup Mode window in a Telnet session.*

To configure the unit using a Telnet session:

1. Click the **Telnet Configuration** tab. The Setup Mode window displays.
2. **Press Enter within 5 seconds**.
3. Continue with step 4 in *5: Configuration via Telnet or Serial Port (Setup Mode)*.

Assigning the IP Address: Serial Port Login

To assign the IP address and other network settings using a serial connection:

1. Connect a console terminal or a PC running a terminal emulation program to the unit's serial port. The default serial port settings are **9600 baud, 8 bits, no parity, 1 stop bit, no flow control**.

2. To enter Setup Mode, cycle the unit's power (power off and back on). After power-up, the self-test begins and the red Diagnostic LED starts blinking. **You have one second** to enter three lowercase **x** characters.

   Note: *The easiest way to enter Setup Mode is to hold down the **x** key at the terminal (or emulation) while powering up the unit.*

3. Select **0** (Server Configuration) and follow the prompts until you get to **IP address**.

4. Enter the new IP address, subnet mask, and gateway (if applicable).

5. Do one of the following:

   - Continue with 5: Configuration via Telnet or Serial Port (Setup Mode).
   - Select **9** to save and exit Setup Mode. The unit performs a power reset.

4: Configuration Using Web-Manager

You must configure the unit so it can communicate on a network with your serial device. For example, you must set the way the unit will respond to serial and network traffic, how it will handle serial packets, and when to start or close a connection.

The unit's configuration is stored in nonvolatile memory and is retained without power. You can change the configuration at any time. The unit performs a reset after you change and store the configuration.

In this chapter, we describe how to configure the SDS using Web-Manager, Lantronix's browser-based configuration tool. (For information on using Setup Mode, our command line configuration interface, see *5: Configuration via Telnet or Serial Port (Setup Mode).*

Note: *The examples in this section show a typical device. Your device may have different configuration options.*

Accessing SDS1101/2101 Using DeviceInstaller

Note: *Make note of the hardware (MAC) address. You will need it to locate the SDS using DeviceInstaller. For more information on the hardware address, see Hardware Address.*

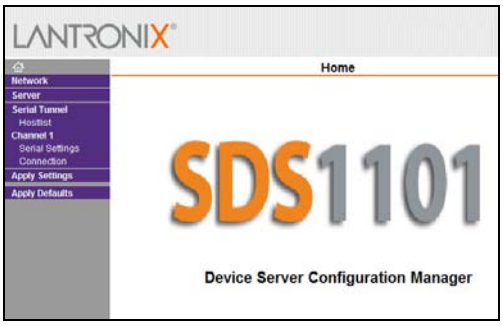
Follow the instructions on the product CD to install and run DeviceInstaller.

1. Run DeviceInstaller and search for the list of available Lantronix device servers.
2. Click the SDS folder. The list of available SDS products displays.
3. Expand the list of SDS1101s by clicking the **+** symbol next to the SDS1101 icon. Likewise, expand the list of SDS2101s by clicking the **+** symbol next to the SDS2101 icon.
4. Select the specific SDS unit by clicking its hardware address.
5. In the right pane, click the **Web Configuration** tab.
6. To view the SDS's Web-Manager in the current DeviceInstaller window, click the **Go** button. To open the Web-Manager in a web browser, click the **External Browser** button. The Web-Manager displays.

Note: *Alternatively, to open Web-Manager, open your web browser and enter the IP address of the* SDS.

A user and password dialog box displays. By default, no username and password are configured.

Figure 4-1. Lantronix Web-Manager

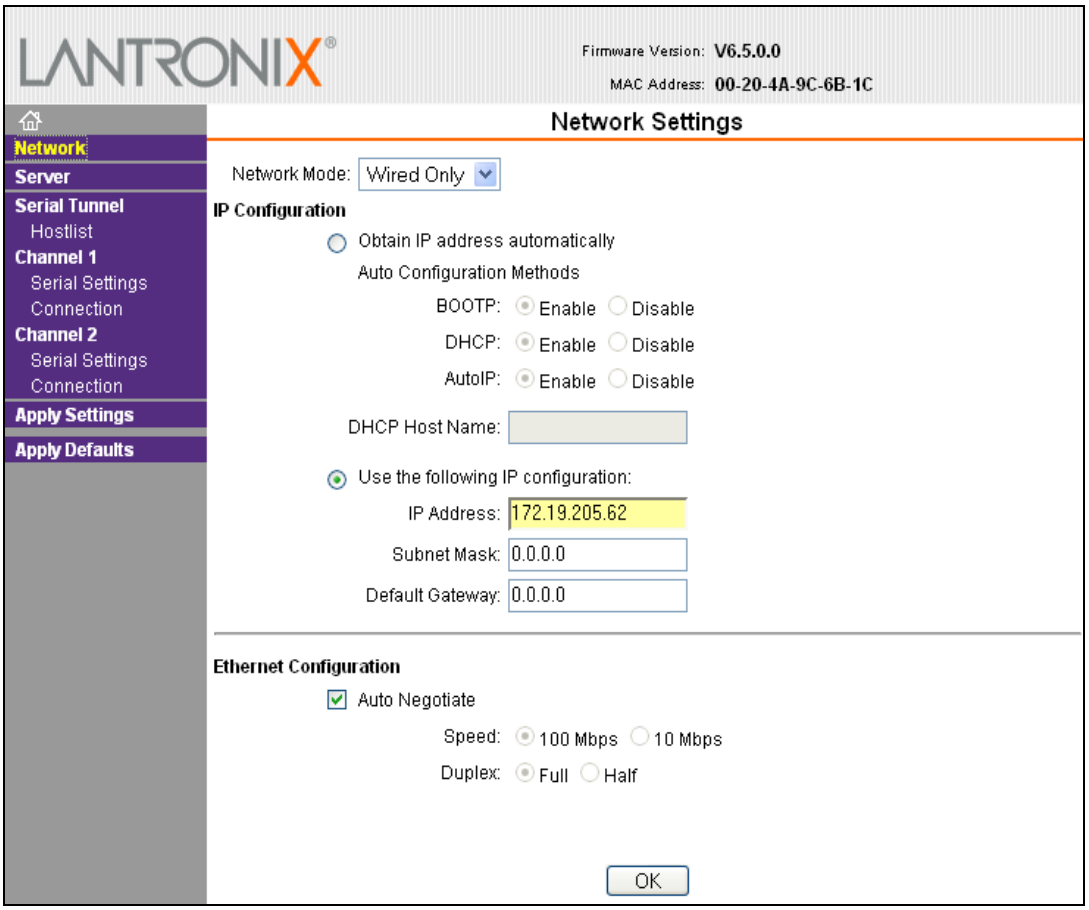


The main menu is in the left pane of the Web-Manager window for both the SDS1101 and SDS2101.

Network Configuration

The unit's network values display when you select **Network** from the main menu. The following sections describe the configurable parameters on the Network Settings page.

Figure 4-2. Network Settings



Automatic IP Address Configuration

An IP address can be assigned automatically. You then enter related network settings.

To assign an IP address automatically:

1. On the main menu, click **Network**.
2. Select **Obtain IP address automatically**.
3. Enter the following (as necessary):

BOOTP	Select Enable to permit the Bootstrap Protocol (BOOTP) server to assign the IP address from a pool of addresses automatically. Enable is the default.
DHCP	Select Enable to permit the Dynamic Host Configuration Protocol (DHCP) to assign a leased IP address to the SDS unit automatically. Enable is the default.
AutoIP	Select Enable to permit the SDS to generate an IP in the 169.254.x.x address range with a Class B subnet. Enable is the default.
DHCP Host Name	Enter the name of the host on the network providing the IP address.

Note: *Disabling BOOTP, DHCP, and AutoIP (all three checkboxes) is not advised as the only available IP assignment method will then be ARP or serial port.*

4. When you are finished, click the **OK** button.
5. On the main menu, click **Apply Settings**.

Static IP Address Configuration

You can manually assign an IP address to the unit and enter related network settings.

To assign an IP address manually:

1. On the main menu, click **Network**.
2. Select **Use the following IP configuration**.
3. Enter the following (as necessary):

IP Address	If DHCP is not used to assign IP addresses, enter it manually in decimal-dot notation. The IP address must be set to a unique value in the network.
Subnet Mask	A subnet mask defines the number of bits taken from the IP address that are assigned for the host part.
Default Gateway	The gateway address, or router, allows communication to other LAN segments. The gateway address should be the IP address of the router connected to the same LAN segment as the unit. The gateway address must be within the local network.

4. When you are finished, click the **OK** button.
5. On the main menu, click **Apply Settings**.

Ethernet Configuration

You must specify the speed and direction of data transmission.

To specify how data will be transmitted:

1. On the main menu, click **Network**.
2. Enter the following (as necessary):

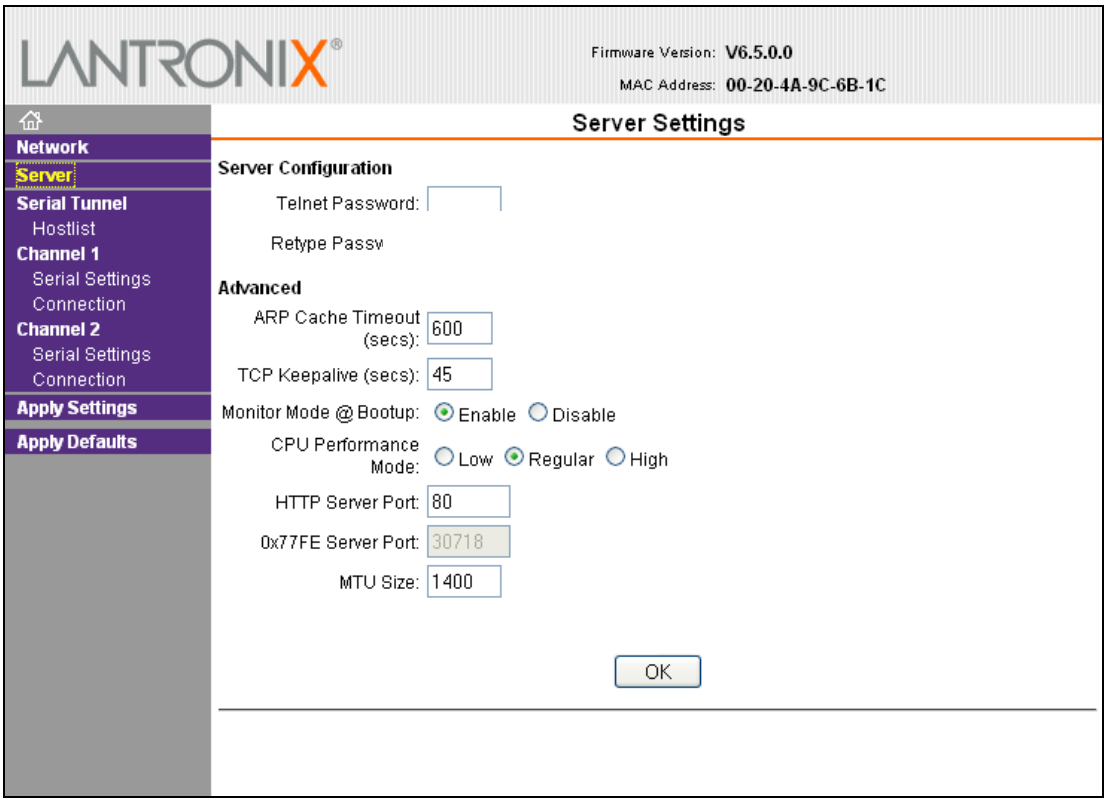
Auto Negotiate	With this option, the Ethernet port auto-negotiates the speed and duplex with the hardware endpoint to which it is connected. This is the default. If this option is not selected, complete the fields that become available: ◆ **Speed:** The speed of data transmission. The default setting is **100 Mbps**. ◆ **Duplex:** The direction of data transmission. The default setting is **Full**.

3. When you are finished, click the **OK** button.
4. On the main menu, click **Apply Settings**.

Server Configuration

The unit's server values display when you select **Server** from the main menu. The following sections describe the configurable parameters on the Server Settings page.

Figure 4-3. Server Settings



To configure the SDS's device server settings:

1. On the main menu, click **Server**.
2. Configure or modify the following fields:

Server Configuration

Telnet Password	Enter the password required for Telnet access.
Retype Password	Re-enter the password required for Telnet access.

Advanced

ARP Cache Timeout (secs)	When the unit communicates with another device on the network, it adds an entry into its ARP table. ARP Cache timeout defines the number of seconds (1-600) before it refreshes this table. The default setting is **600**.
TCP Keepalive (secs)	TCP Keepalive time defines how many seconds the unit waits during an inactive connection before checking its status. If the unit does not receive a response, it drops that connection. Enter a value between 0 and 60 seconds. 0 disables keepalive. The default setting is **45**.

Monitor Mode @ Bootup	Select Disable to disable entry into the monitor mode using the yyy or xx1 key sequence at startup. This field prevents the unit from entering monitor mode by interpreting the stream of characters that are received during the device server's initialization at startup. The default setting is **Enable**.
CPU Performance Mode (SDS2101 Only)	Select the **SDS2101's** performance mode. Higher performance settings require more energy. **Low** is 26 Mhz. **Regular** is 48 Mhz; **High** is 88 Mhz. The default is **Regular**.
HTTP Server Port	This option allows the configuration of the web server port number. The valid range is **1-65535**. The default setting is **80**.
MTU Size	The Maximum Transmission Unit (MTU) is the largest physical packet size a network can transmit for TCP and UDP. Enter between 512 and 1400 bytes. The default setting is **1400 bytes**.

3. When you are finished, click the **OK** button.
4. On the main menu, click **Apply Settings**.

Host List Configuration

The SDS scrolls through the host list until it connects to a device listed in the host list table. After a successful connection, the unit stops trying to connect to any others. If this connection fails, the unit continues to scroll through the table until the next successful connection.

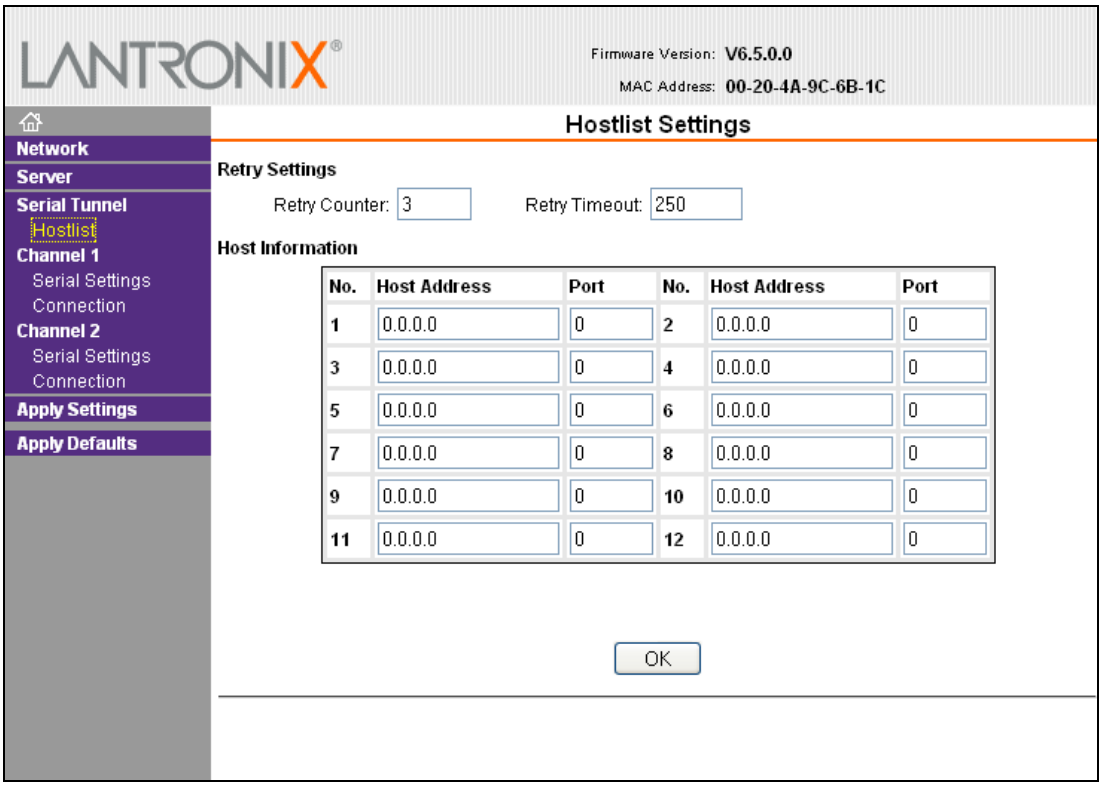
The host list supports a minimum of 1 and a maximum of 12 entries. Each entry contains an IP address and a port number.

Note: *The host list is disabled for Manual and Modem Mode. The unit does not accept a data connection from a remote device when the hostlist option is enabled.*

To configure the host list:

1. On the main menu, click **Hostlist**.

Figure 4-4. Hostlist Settings



2. Enter or modify the following fields:

Retry Settings

Retry Counter	Enter the value for the number of times the SDS should attempt to retry connecting to the host list. The default setting is 3.
Retry Timeout	Enter the duration (in seconds) the SDS should abandon attempting a connection to the host list. The default setting is 250.

Host Information

Host Address	Enter or modify the host's IP address.
Port	Enter the target port number.

3. When you are finished, click the **OK** button.
4. On the main menu, click **Apply Settings**.

Channel 1 & Channel 2 (SDS2101 only) Configuration

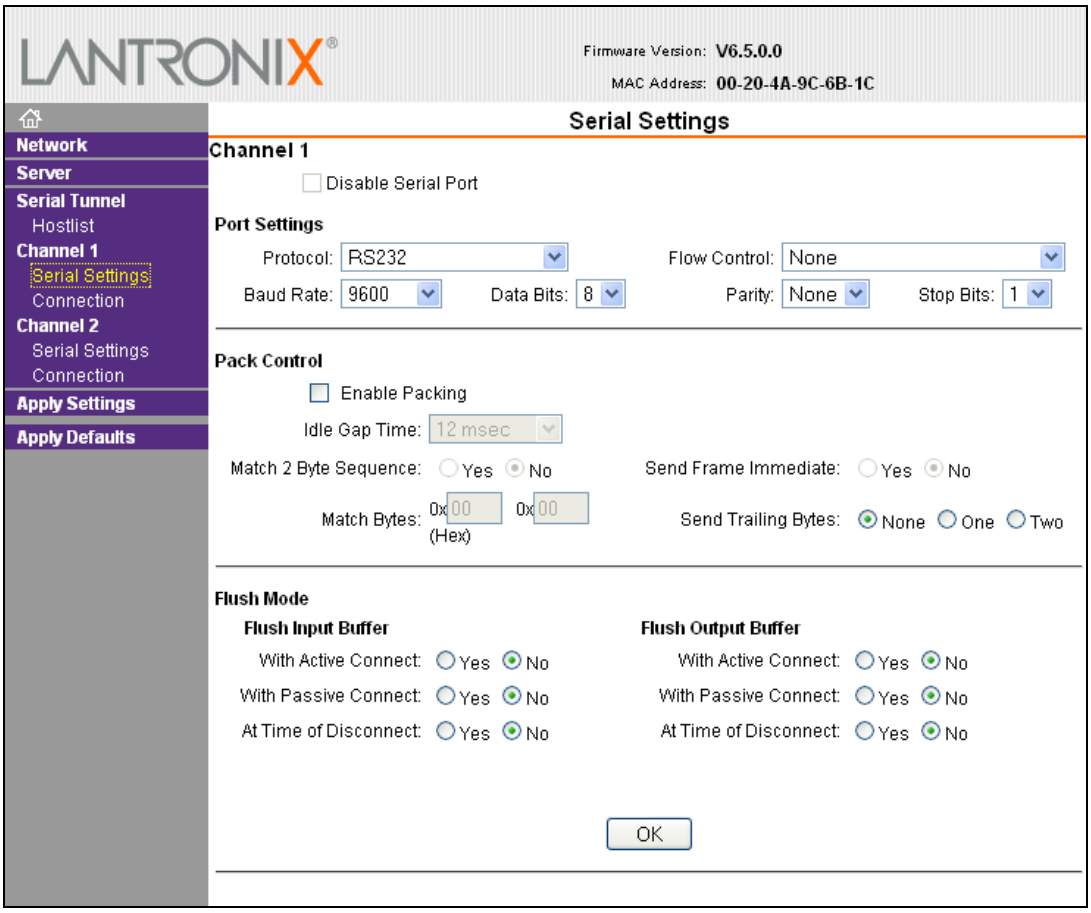
The Channel configuration defines how the serial port responds to network and serial communication.

Serial Settings

To configure the channel's serial settings:

1. On the main menu, click **Serial Settings** (under **Channel 1**) to display the Serial Settings window.

Figure 4-5. Channel Serial Settings



2. In the available fields, enter the following information:

Channel 1

Disable Serial Port	When selected, disables communication through the serial port. The serial port is enabled by default. **Note**: This feature is not available on single port device servers.

Port Settings

Protocol	From the drop-down menu, select the protocol type for the selected channel. The default setting is **RS232**.
Flow Control	Flow control manages data flow between devices in a network to ensure it is processed efficiently. Too much data arriving before a device is prepared to manage it causes lost or retransmitted data. **None** is the default.
Baud Rate	The unit and attached serial device, such as a modem, must agree on a speed or baud rate to use for the serial connection. Valid baud rates are 300, 600, 1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, and 230400 baud. The SDS2101 also supports 460800 and 921600 baud. The

	default setting is **9600**.
Data Bits	Indicates the number of bits in a transmitted data package. The default setting is **8**.
Parity	Checks for the parity bit. The default setting is **None**.
Stop Bits	The stop bit follows the data and parity bits in serial communication. It indicates the end of transmission. The default setting is **1**.

Pack Control

Enable Packing	Select to enable packing on the SDS. Two firmware-selectable packing algorithms define how and when packets are sent to the network. The standard algorithm is optimized for applications in which the unit is used in a local environment, allowing for very small delays for single characters, while keeping the packet count low. The alternate packing algorithm minimizes the packet count on the network and is especially useful in applications in a routed Wide Area Network (WAN). Adjusting parameters in this mode can economize the network data stream. Disabled by default.
Idle Gap Time	Select the maximum time for inactivity. The default time is **12 milliseconds**.
Match 2 Byte Sequence	Use to indicate the end of a series of data to be sent as one group. The sequence must occur sequentially to indicate end of the data collection to the SDS. The default setting is **No**.
Match Bytes	Use to indicate the end of a series of data to be sent as one group. Set this value to 00 if specific functions are not needed.
Send Frame Only	After the detection of the byte sequence, indicates whether to send the data frame or the entire buffer. Select Yes to send only the data frame. The default setting is **No**.
Send Trailing Bytes	Select the number of bytes to send after the end-of-sequence characters. The default setting is **None**.

Flush Input Buffer (Serial to Network)

With Active Connect	Select Yes to clear the input buffer with a connection that is initiated from the device to the network. The default setting is **No**.
With Passive Connect	Select Yes to clear the input buffer with a connection initiated from the network to the device. The default setting is **No**.
At Time of Disconnect	Select Yes to clear the input buffer when the network connection to or from the device is disconnected. The default setting is **No**.

Flush Output Buffer (Network to Serial)

With Active Connect	Select Yes to clear the output buffer with a connection that is initiated from the device to the network. The default setting is **No**.
With Passive Connect	Select Yes to clear the output buffer with a connection initiated from the network to the device. The default setting is **No**.
At Time of Disconnect	Select Yes to clear the output buffer when the network connection to or from the device is disconnected. The default setting is **No**.

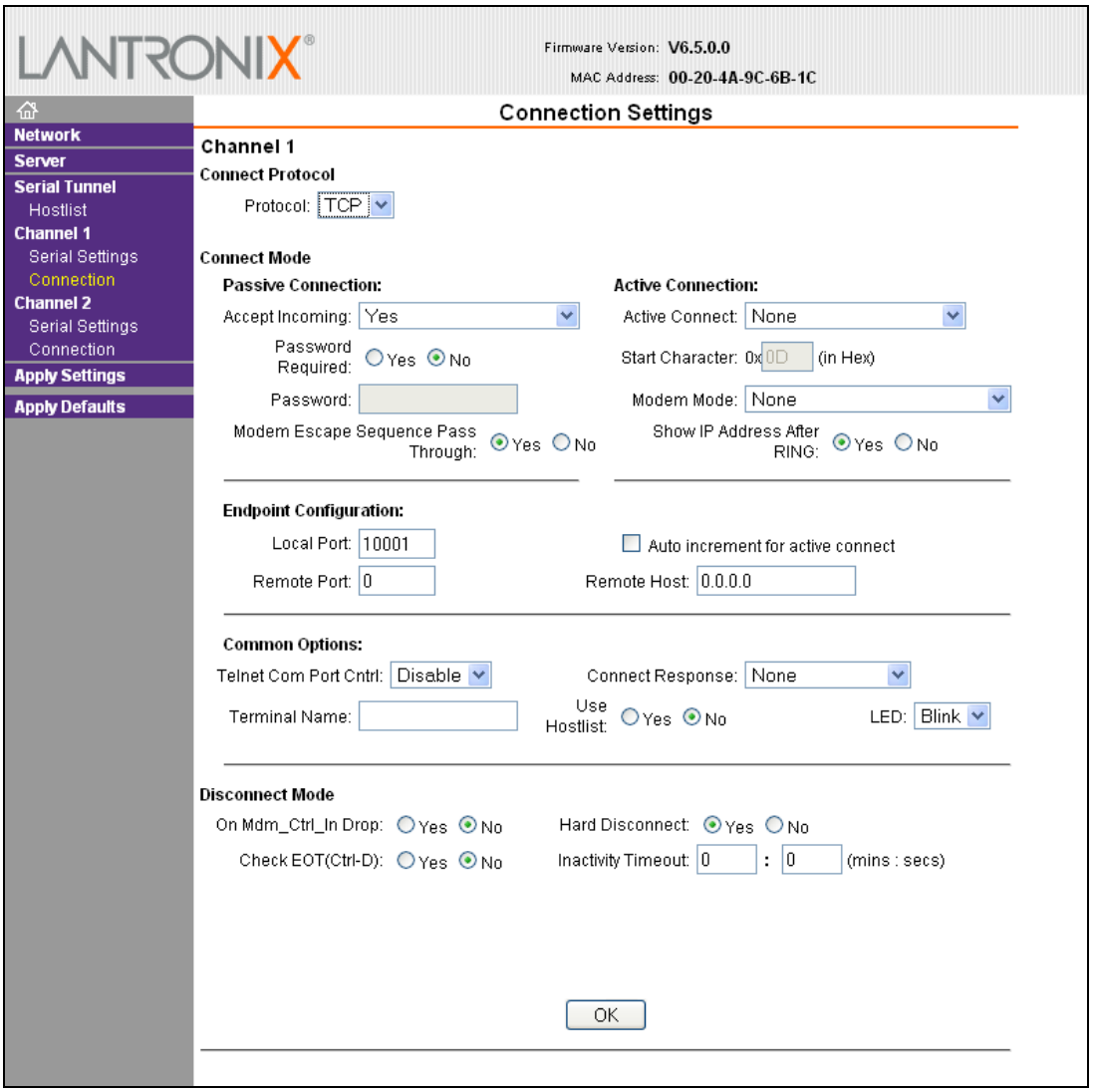
3. When you are finished, click the **OK** button.
4. On the main menu, click **Apply Settings**.

Connection Settings - TCP

To configure a channel's TCP settings:

1. On the main menu, click **Connection.** The Connection Settings window for the channel displays.

Figure 4-6. TCP Connection Settings



2. In the available fields, enter or modify the following information:

Connect Protocol

Protocol	From the drop-down menu, select TCP.

Connect Mode: Passive Connection

Accept Incoming	Select Yes to accept incoming connections. The default setting is Yes.
Password Required	Determines whether a password is required for an incoming passive connection. This field is not available when a password is set for Telnet mode. The default setting is **No**.
Password	If **Password Required** was set to **Yes**, enter the password for passive connections.

Modem Escape Sequence Pass Through	Disable or enable the unit's ability to send the escape sequence. The default is **Y** (Yes) (send the escape sequence).

Connect Mode: Active Connection

Active Connect	Select **None** (default) to disable **Active Connect**. Otherwise, indicate the connection type from the drop-down list: ◆ **With Any Character:** Attempts to connect when any character is received from the serial port. ◆ **With Active Mdm Ctrl In:** Accepts external connection requests only when the **Modem Control In** input is asserted. ◆ **With Start Character:** Attempts to connect when it receives a specific start character from the serial port. The default start character is carriage return. ◆ **Manual Connection:** Attempts to connect when directed by a command string received from the serial port. ◆ **Auto Start:** Automatically connects to the remote IP address and port after booting up.
Start Character	If Active Connect is set to With Start Character, enter the start character in this field. The default setting is **0D**.
Modem Mode	Indicates the on-screen response type when in Modem Mode (if Modem Mode is enabled). The default setting is **None**.
Show IP Address After Ring	Indicates whether to display the remote IP address upon connection. The default setting is **Yes**.

Endpoint Configuration

Local Port	Enter the local port number.
Auto increment for active connect	Select to auto-increment the local port number for new outgoing connections. The range of auto-incremented port numbers is 50,000 to 59,999 and loops back to the beginning when the maximum range is reached. Disabled by default.
Remote Port	Enter the remote port number.
Remote Host	Enter the IP address of the remote device.

Common Options

Telnet Com Port Cntrl	This field is available for configuration only when **Active Connect** is set to **None**. Select **Enable** to permit Telnet communication to the SDS unit. The **Telnet Com Port Cntrl** feature is used in conjunction with the Com Port Redirector (CPR) utility. (See the CPR online Help for details.)
Terminal Name	This field is available for configuration only when **Telnet Com Port Cntrl** is set to **Enable**.

	Use the terminal name for the Telnet terminal type. Enter only one name. When this option is enabled, the unit also reacts to the end of record (EOR) and binary options, which can be used for applications such as terminal emulation to IBM hosts.
Connect Response	A single character is transmitted to the serial port when there is a change in connection state. The default setting is **None**.
Use Hostlist	If this option is set to **True**, the device server scrolls through the host list until it connects to a device listed in the host list table. Once it connects, the unit stops trying to connect to any others. If this connection fails, the unit continues to scroll through the table until it connects to another IP in the host list. The host list is disabled for Manual Mode and for Modem Mode. The unit will not accept a data connection from a remote device when the host list option is enabled.
LED	Select **Blink** for the status LEDs to blink upon connection, or select **None** for no LED output. The default setting is Blink.

Disconnect Mode

On Mdm_Ctrl_In Drop	Set to **Yes** for the network connection to or from the serial port to disconnect (drop) when **Modem Control In** (DSR for SDS1101) transitions from a high state to a low state. The default setting is **No**.
Hard Disconnect	When set to **Yes**, the TCP connection closes even if the remote site does not acknowledge the disconnect request.
With EOT	Select Yes to drop the connection when **Ctrl-D** or **Hex 04** is detected. Both **Telnet Com Port Cntrl** and **Check EOT (Ctrl+ D)** must be enabled for **Disconnect with EOT** to function properly. **Ctrl+D** is only detected going from the serial port to the network. The default setting is **No**.
Inactivity Timeout	Use this parameter to set an inactivity timeout. The unit drops the connection if there is no activity on the serial line before the set time expires. Enter time in the format mm:ss, where m is the number of minutes and s is the number of seconds. To disable the inactivity timeout, enter **00:00**.

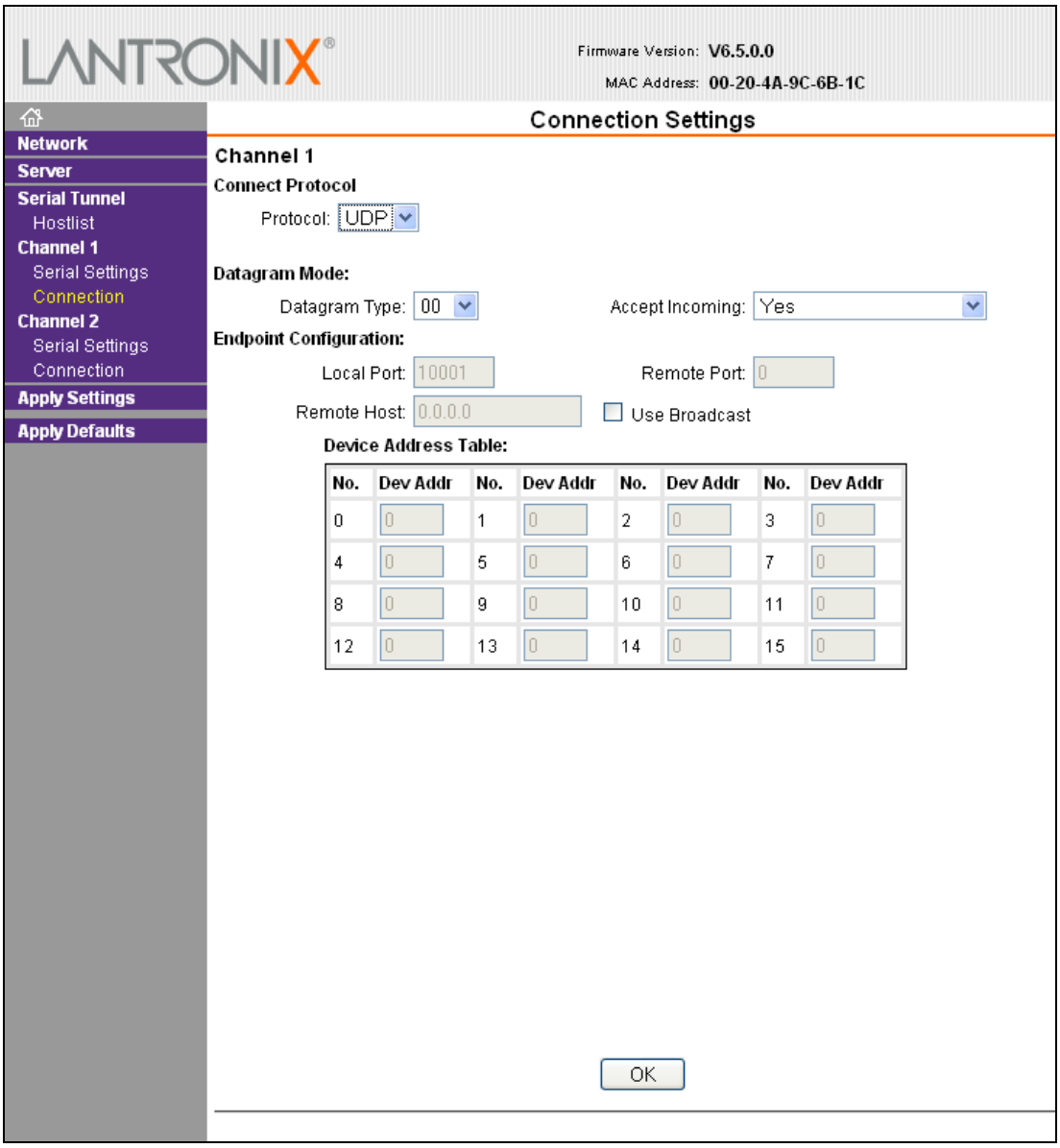
3. When you are finished, click the **OK** button.
4. On the main menu, click **Apply Settings**.

Connection Settings - UDP

To configure a channel's UDP settings:

1. On the main menu, click **Connection**. The Connection Settings window for the selected channel displays.
2. In the available fields, enter or modify the following information:

Figure 4-7. UDP Connection Settings



Connect Protocol

Protocol	Select UDP from the drop-down menu.

Datagram Mode

Datagram Type	Configures the remote IP or network broadcast address and the remote port. Enter 01 for directed or broadcast UDP. The default setting is 00.
Accept Incoming	Select Yes to accept incoming UDP datagrams. The default setting is Yes.

Endpoint Configuration

Local Port	Enter the local port number.

Remote Port	Enter the port number of the remote device.
Remote Host	Enter the IP address of the remote device.
Use Broadcast	Select to broadcast the UDP datagram. Datagrams of type 01 can be sent as a broadcast by enabling this option. The default is not to broadcast. **Note:** Datagrams are sent as subnet-directed broadcasts.
Device Address Table	The table is enabled when Datagram Type is set to FD. Enter values between 1 and 255 to identify units on the local network of device servers. **Note:** Lantronix Tech Support supports Datagram type 01. Datagram Type FD is for OEM use.

3. When you are finished, click the **OK** button.
4. On the main menu, click **Apply Settings**.

Apply Settings

1. To save and apply the configuration changes to the device server, click the **Apply Settings** button.

Note: *Clicking **OK** on each page does not change the configuration on the device. **OK** tells the SDS what changes to use; **Apply Settings** makes the changes permanent and reboots the SDS.*

Apply Factory Defaults

1. Click the **Apply Defaults** button to set the device server back to the default settings**.** For details see *Default Settings (Option 7)*.
2. Click **Yes** to set factory settings, or click **No** to cancel.

5: Configuration via Telnet or Serial Port (Setup Mode)

You must configure the unit so it can communicate on a network with your serial device. As an alternative to using a web browser, as described in the previous chapter, you can use the following procedures remotely or locally:

- Use a Telnet connection to configure the unit over the network.
- Use a terminal or terminal emulation program to access the serial port locally.

The series of prompts at which you enter configuration settings is called **Setup Mode**.

Note: *Detailed information about other setup methods is available from your Lantronix Sales Associate.*

The unit's configuration is stored in nonvolatile memory and is retained without power. You can change the configuration at any time. The unit performs a reset after the configuration has been changed and stored.

This chapter tells you how to access Setup Mode and the general procedure for using it. To complete the configuration, continue with *6: Setup Mode: Server Configuration*, *7: Setup Mode: Channel Configuration*, and *8: Setup Mode: Advanced Settings*.

Note: *The menus in the configuration chapters show a typical device. Your device may have different configuration options.*

Accessing Setup Mode

Telnet Connection

To configure the unit over the network, establish a Telnet connection to port 9999.

Note: *You can also use DeviceInstaller to access Telnet. Select the device from the main window list, and click the* ***Telnet Configuration*** *tab. Skip steps 1 and 2.*

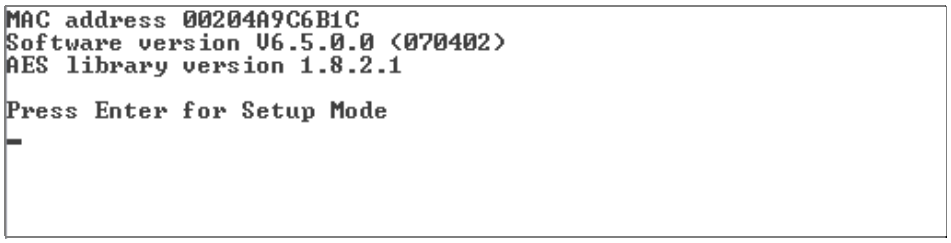
To establish a Telnet connection:

1. From the Windows **Start** menu, click **Run** and type the following command, where x.x.x.x is the IP address, and 9999 is the unit's fixed network configuration port number:

   Windows: `telnet x.x.x.x 9999`
   UNIX: `telnet x.x.x.x 9999`

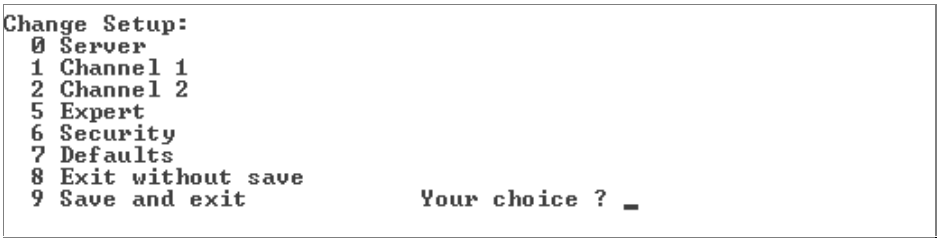
2. Click **OK**. The following information displays.

Figure 5-1. MAC Address



3. To enter Setup Mode, press **Enter** within 5 seconds. The configuration settings display, followed by the **Change Setup** menu.

Figure 5-2. Setup Menu Options



4. Select an option on the menu by entering the number of the option in the **Your choice** ? field and pressing **Enter**.
5. To enter a value for a parameter, type the value and press **Enter**, or to confirm a current value, just press **Enter**.
6. When you are finished, save the new configuration (option 9). The unit reboots.

Serial Port Connection

To configure the unit through a serial connection:

1. Connect a console terminal or PC running a terminal emulation program to your unit's serial port. The default serial port settings are **9600 baud, 8 bits, no parity, 1-stop bit, no flow control**.

   Note: *The SDS always uses the above serial settings at bootup.*

2. Reset the SDS unit by cycling the unit's power (turning the power off and back on). Immediately upon resetting the device, enter three lowercase **x** characters (**xxx**).

   Note: *The easiest way to enter Setup Mode is to hold down the* ***x*** *key at the terminal (or emulation) while resetting the unit.* ***You must do this within three seconds of resetting the SDS.***

At this point, the screen display is the same as when you use a Telnet connection. To continue, go to step 3 in *Telnet Connection,* above.

Exiting Setup Mode

To exit setup mode, use one of the following two options:

- To save all changes and reboot the device, select option **9 Save and exit** from the Change Setup menu. All values are stored in nonvolatile memory.
- To exit the configuration mode without saving any changes or rebooting. select option **8 Exit without save** from the Change Setup menu.

6: Setup Mode: Server Configuration

This chapter explains how to configure the network settings.

Note: *Current values display in parentheses.*

Server Configuration (Option 0)

The unit's basic network parameters display when you select **Server configuration** (option **0**). The **IP Address**, **Set Gateway IP Address**, and **Netmask** fields display the current values.

Figure 6-1. Network Settings

```
IP Address : (000) .(000) .(000) .(000)
Set Gateway IP Address (N)
Netmask: Number of Bits for Host Part (0=default)  (0)
Change telnet config password (N)
```

IP Address

If DHCP is not used to assign IP addresses, enter the IP address manually. The IP address must be set to a unique value in the network. Enter each octet and press **Enter** between each section. The current value displays in parentheses.

```
IP Address : (000) (000) (000) (000) _
```

If DHCP is used, the third octet of the IP address sets the BootP/DHCP/AutoIP options. The following table shows the bits you can manually configure to force the SDS to disable AutoIP, DHCP, or BootP. To disable an option, set the appropriate bit.

Table 6-1. BootP/DHCP/AutoIP options

Options	Bit	Value
AutoIP	0	1
DHCP	1	2
BootP	2	4

For example, if the third octet is 0.0.5.0, the AutoIP and BootP options are disabled; only DHCP is enabled. (The value 5 results from adding the binary equivalents of 0 and 2.) This is the most common setting when using DHCP.

Set Gateway IP Address

The gateway address, or router, allows communication to other LAN segments. The gateway address should be the IP address of the router connected to the same LAN segment as the unit. The gateway address must be within the local network. The

default setting is **N** (No), meaning the gateway address has not been set. To set the gateway address, type **Y** and enter the address.

```
Set Gateway IP Address (N) ? Y
Gateway IP addr (000) (000) (000) (000)_
```

Netmask: Number of Bits for Host Part

A netmask defines the number of bits taken from the IP address that are assigned for the host part.

```
Netmask: Number of Bits for Host Part (0=default) (0) _
```

Note: *Class A: 24 bits; Class B: 16 bits; Class C: 8 bits*

The unit prompts for the number of host bits to be entered, then calculates the netmask, which appears in standard decimal-dot notation (for example, 255.255.255.0) when the saved parameters display. The default setting is **0**.

Table 6-2. Standard IP Network Netmasks

Network Class	Host Bits	Netmask
A	24	255.0.0.0
B	16	255.255.0.0
C	8	255.255.255.0

Change Telnet Configuration Password

Setting the Telnet configuration password prevents unauthorized access to the setup menu through a Telnet connection to port 9999 or through web pages. The password must have 4 characters. The default setting is **N** (No).

Figure 6-2. Change Telnet Configuration Password

```
Change telnet config password (N) ? _
```

An enhanced password setting (for Telnet access only) of 16 characters is available under *Security Settings (Option 6)*.

Note: *You do not need a password to access the Setup Mode window by a serial connection.*

DHCP Name

If a DHCP server has automatically assigned the IP address and network settings, you can discover the unit by using the DeviceInstaller network search feature or Monitor Mode (see *10: Monitor Mode*).

Note: *When you enter Monitor Mode from the serial port with network connection enabled and issue the **NC** (Network Communication) command, you see the unit's IP configuration.*

There are three methods for assigning DHCP names to the unit.

- **Default DHCP Name**: If you do not change the DHCP name, and you are using an IP of 0.0.0.0, then the DHCP name defaults to XX.XX.XX.XX (XXXXXX is the last 6 digits of the MAC address shown on the label on the bottom/side of the unit). For example, if the MAC address is 00-20-4A-12-34-56, then the default DHCP name is C123456.
- **Custom DHCP Name**: You can create your own DHCP name. If you are using an IP address of 0.0.0.0, then the last option in Server configuration is **Change DHCP device name**. This option allows you to change the DHCP name to an alphanumeric name (LTX in our example).

```
Change DHCP device name (not set) ? (N) Y
Enter new DHCP device name : LTX
```

- **Numeric DHCP Name:** You can change the DHCP name by specifying the last octet of the IP address. When you use this method, the DHCP name is LTXYY where YY is what you chose for the last octet of the IP address. If the IP address you specify is 0.0.0.12, then the DHCP name is LTX12. This method only works with 2 digit numbers (01-99).

7: Setup Mode: Channel Configuration

This chapter explains how to configure the serial port.

Notes:

- Current values display in parenthesis.
- You must enter some values in hexadecimal notation. (See 0 .)

Channel 1 (Option 1) & Channel 2 (Option 2 on SDS2101 only)

Select **Channel 1** (option **1)** or **Channel 2** (option **2** on SDS2101) from the Change Setup menu to define how the serial port responds to network and serial communications. The following sections describe the configurable parameters within the **Channel** configuration menu.

Figure 7-1. Serial Port Settings

```
Baudrate (9600) ?
I/F Mode (4C) ?
Flow (00) ?
Port No (10001) ?
ConnectMode (C0) ?
Send '+++' in Modem Mode  (Y) ?
Auto increment source port  (N) ?
Remote IP Address : (000) .(000) .(000) .(000)
Remote Port  (0) ?
DisConnMode (00) ?
FlushMode   (00) ?
DisConnTime (00:00) ?:
SendChar 1  (00) ?
SendChar 2  (00) ?
```

Baudrate

The unit and attached serial device, such as a modem, must agree on a speed or baud rate to use for the serial connection. Valid baud rates are 300, 600, 1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, and 230400 baud. The SDS2101 also supports 460800 and 921600 baud.

```
Baudrate (9600) ? _
```

I/F (Interface) Mode

The Interface (I/F) Mode is a bit-coded byte entered in hexadecimal notation. The default setting is **4C**.

```
I/F Mode (4C) ? _
```

The following table displays available I/F Mode options:

Note: *All bit positions in the table that are blank represent "don't care" bits for that particular option, which can be set to either a 0 or 1 value.*

Table 7-1. Interface Mode Options

I/F Mode Option	7	6	5	4	3	2	1	0
RS-232C (1)							0	0
RS-422/485 4-wire							0	1
RS-485 2-wire							1	1
7 Bit					1	0		
8 Bit					1	1		
No Parity			0	0				
Even Parity			1	1				
Odd Parity			0	1				
1 stop bit	0	1						
2 stop bits(1)	1	1						

(1) **2 stop bits are implemented by the software. This might influence performance.**

The following table demonstrates how to build some common Interface Mode settings:

Table 7-2. Common Interface Mode Settings

Common I/F Mode Setting	Binary	Hex
RS-232C, 8-bit, No Parity, 1 stop bit	0100 1100	4C
RS-232C, 7-bit, Even Parity, 1 stop bit	0111 1000	78
RS-485 2-wire, 8-bit, No Parity, 1 stop bit	0100 1111	4F
RS-422, 8-bit, Odd Parity, 1 stop bit	0101 1101	5D

Flow

Flow control sets the local handshaking method for stopping serial input/output. The default setting is **00**.

```
Flow (00) ? _
```

Use the following table to select flow control options:

Table 7-3. Flow Control Options

Flow Control Option	Hex
No flow control	00
XON/XOFF flow control	01
Hardware handshake with RTS/CTS lines	02
XON/XOFF pass characters to host	05

Port Number

The setting represents the source port number in TCP connections. It is the number that identifies the channel for remote initiating connections.

```
Port No (10001) ? _
```

The default setting for Port 1 is **10001,** and for Port 2 is **10002** (SDS2101 only). The range is **1-65535**, except for the following reserved port numbers:

Table 7-4. Reserved Port Numbers

Port Numbers	Reserved for
1 – 1024	Reserved (well known ports)
9999	Telnet setup
14000-14009	Reserved for Redirector
30704	Reserved (77F0h)
30718	Reserved (77FEh)

***Warning:* We recommend that you not use the reserved port numbers for this setting as incorrect operation may result.**

Use Port **0** for the outgoing local port to change with each connection. The port range is **50,000**-**59,999**. Each subsequent connection increments the number by 1 (it wraps back around to 50,000).

Only use this automatic port increment feature to initiate a connection using TCP. Set the port to a non-zero value when the unit is in a passive mode or when using UDP instead of TCP.

Connect Mode

Connect Mode defines how the unit makes a connection, and how it reacts to incoming connections over the network.

```
ConnectMode (C0) ? _
```

Enter Connect Mode options in hexadecimal notation. The default setting is **C0**.

***Note:** All bit positions in the table that are blank represent "don't care" bits for that particular option, which can be set to either a 0 or 1 value.*

Table 7-5. Connect Mode Options

Connect Mode Option	7	6	5	4	3	2	1	0
a) Incoming Connection								
Never accept incoming	0	0	0					
Accept with DTR Active	0	1	0					
Always Accept	1	1	0					
b) Response								
Nothing (quiet)				0				
Character response (C=connect, D=disconnect, N=unreachable)				1				
c) Active Startup								
No active startup					0	0	0	0
With any character					0	0	0	1
With DTR Active					0	0	1	0
With a specific start character					0	0	1	1
Manual connection					0	1	0	0
Autostart					0	1	0	1
Hostlist	0	0	1	0				
d) Datagram Type								
Directed UDP					1	1	0	0
e) Modem Mode								
No Echo			0	0		1	1	
Data Echo & Modem Response (Numeric)			0	1		1	1	1
Data Echo & Modem Response (Verbose)			0	1		1	1	0
Modem Response Only (Numeric)			0	0	1	1	1	1
Modem Response Only (Verbose)			0	0	1	1	1	0

a) Incoming Connection

Never Accept Incoming	Rejects all external connection attempts.
Accept with DTR Active	Accepts external connection requests only when the DTR input is asserted. Cannot be used with Modem Mode.
Always Accept	Accepts any incoming connection when a connection is not

	already established. Default setting.

b) Response

Character Response	A single character is transmitted to the serial port when there is a change in connection state: C = connected, D = disconnected, N = host unreachable. This option is overridden when the Active Start Modem Mode or Active Start Host List is in effect. Default setting is Nothing (quiet).

c) Active Startup

No Active Startup	Does *not* attempt to initiate a connection under any circumstance. Default setting.
With Any Character	Attempts to connect when any character is received from the serial port.
With DTR Active	Attempts to connect when the DTR input changes from not asserted to asserted.
With a Specific Start Character	Attempts to connect when it receives a specific start character from the serial port. The default start character is carriage return.
Manual Connection	Attempts to connect when directed by a command string received from the serial port. The first character of the command string must be a C (ASCII 0x43), and the last character must be either a carriage return (ASCII 0x0D) or a line feed (0x0A). No blanks or space characters may be in the command string. Between the first and last command string characters must be a full or partial destination IP address and may be a destination port number. The IP address must be in standard decimal-dot notation and may be a partial address, representing the least significant 1, 2, or 3 bytes of the remote IP address. The period is required between each pair of IP address numbers. If present, the port number must follow the IP address, must be presented as a decimal number in the range 1-65535, and must be preceded by a forward slash (ASCII 0x2F). The slash separates the IP address and the port number. If you omit the port number from a command string, the internally stored remote port number starts a connection. If a partial IP address is presented in a command string, it is interpreted to be the least significant bytes of the IP address and uses the internally stored remote IP address to provide the most significant bytes of the IP address. If the IP address entered is 0.0.0.0/0, the device server enters Monitor Mode. For example, if the remote IP address already configured in the unit is 129.1.2.3, then an example command string would be C3/7. (This would connect to 129.1.2.3 and port 7.) You may also use a different ending for the connection string. For example, C50.1/23 would connect you to 129.1.50.1 and port 23.

Table 7-6. Manual Connection Address Example

Command String	Result if remote IP is 129.1.2.3 and remote port is 1234
C121.2.4.5/1	Complete override; connection is started with host 121.2.4.5, port 1.
C5	Connects to 129.1.2.5, port 1234.
C28.10/12	Connects to 129.1.28.10, port 12.
C0.0.0.0/0	Enters Monitor Mode.

Autostart (Automatic Connection)	If you enable Autostart, the unit automatically connects to the remote IP address and remote port specified when the firmware starts.
Hostlist	If you enable this option, the device server scrolls through the hostlist until it connects to a device listed in the hostlist table. Once it connects, the unit stops trying to connect to any others. If this connection fails, the unit continues to scroll through the table until it is able to connect to another IP in the hostlist. Hostlist supports a minimum of 1 and a maximum of 12 entries. Each entry contains the IP address and the port number. The hostlist is disabled for Manual and Modem Modes. The unit does not accept a data connection from a remote device when the hostlist option is enabled.

Figure 7-2. Hostlist Option

```
Baudrate (9600) ?
I/F Mode (4C) ?
Flow (00) ?
Port No (10001) ?
ConnectMode (25) ?
Send '+++' in Modem Mode  (Y) ?
Auto increment source port  (N) ?

Hostlist :
01. IP : 172.019.000.001  Port : 00023
02. IP : 172.019.000.002  Port : 03001
03. IP : 172.019.000.003  Port : 10001

Change Hostlist ? (N) ? Y
01. IP address : (172) .(019) .(000) .(001)      Port :  (23) ?
02. IP address : (172) .(019) .(000) .(002)      Port :  (3001) ?
03. IP address : (172) .(019) .(000) .(003)      Port :  (10001) ?
04. IP address : (000) .(000) .(000) .(000)
Hostlist :
01. IP : 172.019.000.001  Port : 00023
02. IP : 172.019.000.002  Port : 03001
03. IP : 172.019.000.003  Port : 10001

Change Hostlist ? (N) ? N
Hostlist Retrycounter  (3) ?
Hostlist Retrytimeout  (250) ?
DisConnMode (00) ?
FlushMode   (00) ?
DisConnTime (00:00) ?:
SendChar 1  (00) ?
SendChar 2  (00) ? _
```

To enable the hostlist:

1. Enter a **Connect Mode** of 0x20 (**2**X), where X is any digit. The menu shows you a list of current entries already defined in the product.
2. To delete, modify, or add an entry, select **Yes**. If you enter an IP address of **0.0.0.0**, that entry and all others after it are deleted.
3. After completing the hostlist, repeat the previous step if necessary to edit the hostlist again.
4. For **Retrycounter**, enter the number of times the Lantronix unit should try to make a good network connection to a hostlist entry that it has successfully ARPed. The range is **1-15**, with the default set to **3**.
5. For **Retrytimeout**, enter the number of seconds the unit should wait before failing an attempted connection. The time is stored as units of milliseconds in the range of **10-65535**. The default setting is **250**.

d) Datagram Type

Directed UDP	When selecting this option, you are prompted for the Datagram type. Enter **01** for directed or broadcast UDP. Datagrams of type 01 can be sent as a broadcast by enabling the **Send as Broadcast** option. The default is not to broadcast. **Note:** Datagrams are sent as subnet-directed broadcasts. When the UDP option is in effect, the unit never attempts to initiate a TCP connection because it uses UDP datagrams to send and receive data.

e) Modem Mode

In Modem (Emulation) Mode, the unit presents a modem interface to the attached serial device. It accepts AT-style modem commands and handles the modem signals correctly.

Normally, there is a modem connected to a local PC and a modem connected to a remote machine. A user must dial from the local PC to the remote machine, accumulating phone charges for each connection. Modem Mode allows you to replace modems with SDSs, and to use an Ethernet connection instead of a phone call. By not having to change communications applications, you avoid potentially expensive phone calls.

To select Modem Mode, set the Connect Mode to **C6** (no echo), **D6** (echo with full verbose), **D7** (echo with numeric response), **CF** (modem responses only, numeric response), or **CE** (modem responses only, full verbose).

Note: *If the unit is in Modem Mode, and the serial port is idle, the unit can still accept network TCP connections to the serial port if Connect Mode is set to* ***C6*** *(no echo),* ***D6*** *(echo with full verbose),* ***D7*** *(echo with numeric response,* ***CF*** *(modem responses only, numeric response), or* ***CE*** *(modem responses only, full verbose).*

Without Echo	In Modem Mode, echo refers to the echo of all of the characters entered in command mode; it does *not* mean to echo data that is

	transferred. Quiet Mode (without echo) refers to the modem *not* sending an answer to the commands received (or displaying what was typed).
Data Echo & Modem Response	Full Verbose: The unit echoes modem commands and responds to a command with a message string shown in the table below. Numeric Response: The unit echoes modem commands and responds to a command with a numeric response.
Modem Responses Only	Full Verbose: The unit does not echo modem commands and responds to a command with a message string shown in the table below. Numeric Response: The unit does not echo modem commands and responds to a command with a numeric response.

Table 7-7. Modem Mode Messages

Message	Meaning
Full Verbose	
OK	Command was executed without error.
CONNECT	A network connection has been established.
NO CARRIER	A network connection has been closed.
RING n.n.n.n.	A remote device, having IP address n.n.n.n, is connecting to this device.
Numeric Response	
0	OK
1	Connected
2	Ring
3	No Carrier
4	Error

Received commands must begin with the two-character sequence **AT** and be terminated with a carriage return character.

The unit ignores any character sequence received *not* starting with **AT**, and only recognizes and processes single **AT**-style commands. The unit treats compound **AT** commands as unrecognized commands.

If the **Full Verbose** option is in effect, the unit responds to an unrecognized command string that is otherwise formatted correctly (begins with **AT** and ends with carriage return) with the "OK" message and takes no further action.

If the **Numeric Response** option is in effect, the unit responds to an unrecognized command string that is otherwise formatted correctly with a "0" message and takes no further action.

When an active connection is in effect, the unit transfers data and does not process commands received from the serial interface.

When a connection is terminated or lost, the unit reverts to command mode.

When an active connection is in effect, the unit terminates the connection if it receives the following sequence from the attached serial device:

- No serial data is received for one second.
- The character sequence +++ is received, with no more than one second between each two characters.
- No serial data is received for one second after the last + character. At this time, the unit responds affirmatively per the selected echo/response mode.
- The character string **ATH** is received, terminated with a carriage return. The unit responds affirmatively according to the selected echo/response mode and drops the network connection. The serial interface reverts to accepting command strings.

If this sequence is not followed, the unit remains in data transfer mode.

Table 7-8. Modem Mode Commands

Modem Mode Command	Function
ATDTx.x.x.x,pppp or ATDTx.x.x.x/pppp	Makes a connection to an IP address (x.x.x.x) and a remote port number (pppp).
ATDTx.x.x.x	Makes a connection to an IP address (x.x.x.x) and the remote port number defined within the unit.
ATD0.0.0.0	Forces the unit into Monitor Mode if a remote IP address and port number are defined within the unit.
ATD	Forces the unit into Monitor Mode if a remote IP address and port number are not defined within the unit.
ATDx.x.x.x	Makes a connection to an IP address (x.x.x.x) and the remote port number defined within the unit.
ATH	Hangs up the connection (Entered as +++ATH).
ATS0=n	Enables or disables connections from the network going to the serial port. n=0 disables the ability to make a connection from the network to the serial port. n=1-9 enables the ability to make a connection from the network to the serial port. n>1-9 is invalid.
ATEn	Enables or disables character echo and responses. n=0 disables character echo and responses. n=1 enables character echo and responses.
ATVn	Enables numeric response or full verbose. n=0 enables numeric response. n=1 enables full verbose.

Note: *The unit recognizes these AT commands as single commands such as ATE0 or ATV1; it does not recognize compound commands such as ATE0V.*

Send the Escape Sequence (+++) in Modem Mode

```
Send '+++' in Modem Mode (Y) ? _
```

Disable or enable the SDS's ability to send the escape sequence. The default setting is **Y** (Yes) (send the escape sequence).

Show IP addr after 'RING'

```
Show IP addr after 'RING' <Y> ?
```

Disable or enable the SDS's ability to show the IP address after RING in Modem Mode. The default is **Y** (Yes), to show the IP address.

Auto Increment Source Port

```
Auto increment source port (N) ? _
```

Y (Yes) auto increment the source port. The SDS increments the port number used with each new connection.

Remote IP Address

This is the destination IP address used with an outgoing connection.

```
Remote IP Address : (000) (000) (000) (000)_
```

Note: *This option does not display when Hostlist is enabled from the* ***ConnectMode*** *prompt (see Connect Mode for more information).*

Remote Port

You must set the remote TCP port number for the unit to make outgoing connections. This parameter defines the port number on the target host to which a connection is attempted.

```
Remote Port (0) ? _
```

To connect an ASCII terminal to a host using the unit for login purposes, use the remote port number 23 (Internet standard port number for Telnet services).

Note: *This option does not display when Hostlist is enabled from the* ConnectMode *prompt (see Connect Mode for more information).*

DisConnMode

This setting determines the conditions under which the unit will cause a network connection to terminate. The default setting is **00**.

```
DisConnMode (00) ? _
```

Notes:

- In DisConnMode (Disconnect Mode), DTR drop either drops the connection or is ignored.
- All bit positions in the table that are blank represent "don't care" bits for that particular option, which can be set to either a 0 or 1 value.

Table 7-9. Disconnect Mode Options

Disconnect Mode Option	7	6	5	4	3	2	1	0
Disconnect with Modem Control In drop (6)	1							
Ignore DTR	0							
Telnet Com Port Cntrl and terminal type setup (1)		1						
Channel (port) password (2)				1				
Hard disconnect (3)					0			
Disable hard disconnect					1			
State LED off with connection (4)								1
Disconnect with EOT (^D) (5)			1					

(1) The Telnet Com Port Control feature is used in conjunction with Com Port Redirector. The SDS sends the "Terminal Type" upon an outgoing connection.

(2) A password is required for a connection to the serial port from the network.

(3) The TCP connection closes even if the remote site does not acknowledge the disconnection.

(4) When there is a network connection to or from the serial port, the state LED turns off instead of blinking.

(5) When **Ctrl+D** or **Hex 04** is detected, the connection is dropped. Both **Telnet Com Port Cntrl** and **Disconnect with EOT** must be enabled for **Disconnect with EOT** to function properly. **Ctrl+D** is only detected going from the serial port to the network.

(6) When **Modem Control In** transitions from a high state to a low state, the network connection to or from the serial port drops.

Flush Mode (Buffer Flushing)

Using this parameter, you can control line handling and network buffers with connection startup and disconnect. The default setting is **00**.

```
FlushMode (00) ? _
```

You can also select between two different packing algorithms.

Note: *All bit positions in the table that are blank represent "don't care" bits for that particular option, which can be set to either a 0 or 1 value.*

Table 7-10. Flush Mode Options

Function	7	6	5	4	3	2	1	0
Input Buffer (Serial to Network)								
Clear with a connection initiated from the device to the network				1				
Clear with a connection initiated from the network to the device			1					
Clear when the network connection to or from the device is disconnected		1						
Output Buffer (Network to Serial)								
Clear with a connection initiated from the device to the network								1
Clear with a connection initiated from the network to the device							1	
Clear when the network connection to or from the device is disconnected						1		
Alternate Packing Algorithm (Pack Control)								
Enable	1							

Pack Control

The packing algorithms define how and when packets are sent to the network. The standard algorithm is optimized for applications in which the unit is used in a local environment, allowing for very small delays for single characters, while keeping the packet count low. The alternate packing algorithm minimizes the packet count on the network and is especially useful in applications in a routed Wide Area Network (WAN). Adjusting parameters in this mode can economize the network data stream.

Pack control settings are enabled in Flush Mode. Set this value to **00** if you do not need specific functions.

Note: *All bit positions in the table that are blank represent "don't care" bits for that particular option, which can be set to either a 0 or 1 value.*

Table 7-11. Pack Control Options

Option	7	6	5	4	3	2	1	0
Packing Interval								
Interval: 12 msec							0	0
Interval: 52 msec							0	1
Interval: 250 msec							1	0
Interval: 5 sec							1	1
Trailing Characters								
None					0	0		
One					0	1		
Two					1	0		
Send Characters								

Option	7	6	5	4	3	2	1	0
2-Byte Send Character Sequence				1				
Send Immediately After Send chars			1					

Packing Interval

Packing Interval defines how long the unit should wait before sending accumulated characters. This wait period is between successive network segments containing data. For alternate packing, the default interval is **12 ms**.

Trailing Characters

In some applications, CRC, Checksum, or other trailing characters follow the end-of-sequence character; this option helps to adapt frame transmission to the frame boundary. The default setting is **00** (none).

Send Characters

- If **2-Byte Send Character Sequence** is enabled, the unit interprets the sendchars as a 2-byte sequence; if this option is not enabled, the unit interprets them independently. The default setting is **0** (disabled).
- If **Send Immediately After Characters** is *not* set, any characters already in the serial buffer are included in the transmission after a "transmit" condition is found. If this option is set, the unit sends immediately after recognizing the transmit condition (sendchar or timeout). The default setting is **0**.

Note: *A transmission might occur if status information needs to be exchanged or an acknowledgment needs to be sent.*

DisConnTime (Inactivity Timeout)

Use this parameter to set an inactivity timeout. The unit drops the connection if there is no activity on the serial line before the set time expires. Enter time in the format mm:ss, where m is the number of minutes and s is the number of seconds.

```
DisConnTime (00:00) ?:
```

To disable the inactivity timeout, enter **00:00**. Range is 0 (disabled) to 5999 seconds (99 minutes, 59 seconds). Default setting is **0**.

Send Characters

Enter up to two characters in hexadecimal representation in sendchar.

```
SendChar 1 (00) ? _
SendChar 2 (00) ? _
```

If the unit receives a character on the serial line that matches one of these characters, it sends the character immediately, along with any awaiting characters, to the TCP connection. This action minimizes the response time for specific protocol characters on the serial line (for example, ETX, EOT). Setting the first sendchar to **00**

disables the recognition of the characters. Alternatively, the unit can interpret two characters as a sequence (see *Pack Control*). The default setting is **00.**

Telnet Terminal Type

This parameter displays only if you enabled the terminal type option in Disconnect Mode. With this option enabled, you can use the terminal name for the Telnet terminal type. Enter only one name.

With terminal type option enabled, the unit also reacts to the EOR (end of record) and binary options, useful for applications like terminal emulation to IBM hosts.

Channel (Port) Password

This parameter appears only if the channel (port) password option is enabled in Disconnect Mode. With this option enabled, you can set a password on the serial port. The default setting is all **0**s.

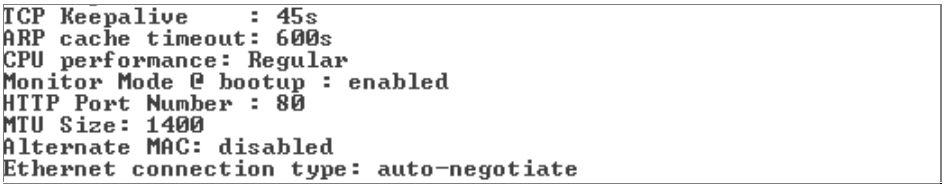
8: Setup Mode: Advanced Settings

Expert Settings (Option 5)

Note: *You can change these settings using Telnet or serial connections, but not all of them are available on the Web-Manager.*

Caution: ***Changing the expert settings can drastically affect the performance and access to the product. These settings should only be changed by an experienced network administrator.***

Figure 8-1. Expert Settings


TCP Keepalive : 45s
ARP cache timeout: 600s
CPU performance: Regular
Monitor Mode @ bootup : enabled
HTTP Port Number : 80
MTU Size: 1400
Alternate MAC: disabled
Ethernet connection type: auto-negotiate

This option allows you to change how many seconds the unit waits during a silent connection before attempting to see if the currently connected network device is still on the network. If the unit gets no response, it drops that connection. The default setting is **45**.

```
TCP Keepalive time in s (1s – 65s; 0s=disable): (45)? _
```

ARP Cache timeout in seconds

Whenever the unit communicates with another device on the network, it adds an entry into its ARP table. The ARP Cache timeout option allows you to define how many seconds (1-600) the unit will wait before timing out this table. The default setting is **600**.

```
ARP Cache timeout in s (1s – 600s): (600)? _
```

CPU Performance (SDS2101 only)

Select the SDS2101's performance mode. Higher performance settings require more energy. **Low** is 26 Mhz; **Regular** is 48 Mhz; **High** is 88 Mhz. The default is **Regular**.

```
CPU performance (0=Regular, 1=Low, 2=High): (0)
```

Disable Monitor Mode at bootup

This option allows you to disable all entries into Monitor Mode during startup, except for the 'xxx' sequence. This prevents entry using **yyy**, **zzz**, **xx1**, and **yy1** key

sequences (only during the bootup sequence). The default for Disable Monitor Mode at bootup is **N** (No). (See *10: Monitor Mode*.)

```
Monitor Mode @ bootup :  enabled
```

HTTP Port Number

This option allows the configuration of the web server port number. The valid range is **1-65535**. The default HTTP port number is **80**.

```
HTTP Port Number : (80) ? _
```

MTU Size

The Maximum Transmission Unit (MTU) is the largest physical packet size a network can transmit for TCP and UDP. Enter between **512** and **1400** bytes. The default setting is **1400** bytes.

```
MTU Size: (1400) ? _
```

Enable alternate MAC

If necessary, enable the alternate MAC address (if specified in the OEM setup record). The default setting is **N** (No).

```
Enable alternate MAC (N) ? _
```

Ethernet connection type

The SDS allows for the Ethernet speed and duplex to be manually configured. Enter **0** for auto-negotiation (default). To select the speed and duplex, enter one of the following: **2** (10Mbit/half duplex), **3** (10Mbit/full duplex), **4** (100Mbit/half duplex), or **5** (100Mbit/full duplex).

```
Ethernet connection type: (0) ? _
```

Security Settings (Option 6)

You can change security settings by means of Telnet or serial connections only, not on the Web-Manager. We recommend that you set security over the dedicated network or over the serial setup to prevent eavesdropping.

***Caution:* Disabling both Telnet Setup and Port 77FE will prevent users from accessing the setup menu from the network. Disabling Port 77FE also disables the Web from configuring the device.**

Select **6** to configure security settings.

Figure 8-2. Security Settings

```
Disable SNMP (N) ?
SNMP Community Name (public):
Disable Telnet Setup (N) ?
Disable TFTP Firmware Update (N) ?
Disable Port 77FEh (N) ?
Disable Web Server (N) ?
Disable Web Setup (N) ?
Disable ECHO ports (Y) ?
Enable Encryption (N) ?
Enable Enhanced Password (N) ?
```

Disable SNMP

This setting allows you to disable the SNMP protocol on the unit for security reasons. The default setting is **N** (No).

```
Disable SNMP (N) ?
```

SNMP Community Name

The SNMP Community Name is a required field for NMS to read or write to a device. Enter a string of **1** to **13** characters. The default setting is **public**.

```
SNMP Community Name (public):
```

The default entry is **public**. The current value is displayed in parentheses.

Disable Telnet Setup

Note: *If you choose to disable this option, keep in mind that disabling both Telnet Setup and Port 77FE will prevent users from accessing the setup menu from the network.*

This setting defaults to the **N** (No) option. The **Y** (Yes) option disables access to Setup Mode by Telnet (port 9999). It only allows access locally using the web pages and the serial port of the unit.

```
Disable Telnet Setup (N) ?
```

Disable TFTP Firmware Update

This setting defaults to the **N** (No) option. The **Y** (Yes) option disables the use of TFTP to perform network firmware upgrades. With this option, you can download firmware upgrades over the serial port using DeviceInstaller's Recover Firmware procedure. (See *9: Firmware Upgrades*.)

```
Disable TFTP Firmware Update (N) :
```

Disable Port 77FE (Hex)

Note: *If you choose to disable this option, keep in mind that disabling both Telnet Setup and Port 77FE will prevent users from accessing the setup menu from the network.*

Port 77FE is a setting that allows DeviceInstaller, Web-Manager, and custom programs to configure the unit remotely. You may wish to disable this capability for security purposes.

```
Disable Port 77FEh (N) ?
```

The default setting is the **N** (No) option, which enables remote configuration. You can configure the unit by using DeviceInstaller, web pages, Telnet, or serial configuration.

The **Y** (Yes) option disables remote configuration and web sites.

Disable Web Server

This setting defaults to the **N** (No) **option**. The **Y** (Yes) option disables the web server.

```
Disable Web Server (N) ?
```

Disable Web Setup

The **Y** (Yes) option disables configuration using the Web-Manager. This setting defaults to the **N** (No) **option**.

```
Disable Web Setup (N) ?
```

Disable ECHO Ports

This setting controls whether port 7 echoes characters it receives. The default setting is **Y** (Yes), which disables ECHO ports.

```
Disable ECHO ports (Y) ?
```

Enable Enhanced Password

This setting defaults to the **N** (No) option, which allows you to set a 4-character password that protects Setup Mode by means of Telnet and web pages. The **Y** (Yes) option allows you to set an extended security password of 16-characters for protecting Telnet and Web Page access.

```
Enable Enhanced Password (N) ?
```

Enable Encryption

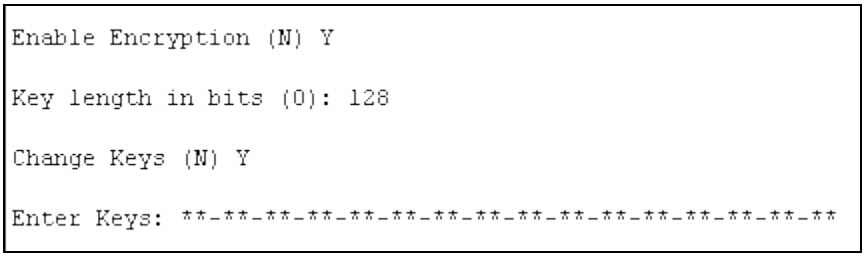
Rijndael is the block cipher algorithm chosen by the National Institute of Science and Technology (NIST) as the Advanced Encryption Standard (AES) to be used by the US government. The SDS supports 128-, 192-, and 256-bit encryption key lengths.

NOTE: *Configuring encryption should be done through a local connection to the serial port of the SDS, or via a secured network connection. Initial*

configuration information including the encryption key are sent in clear text over the network.

To configure AES encryption on the SDS:

Figure 8-3. Encryption Keys



1. When prompted to enable encryption, press **Y**.
2. Enter the encryption key length when prompted. The SDS supports 128-, 192-, and 256-bit encryption key lengths.
3. When prompted to change keys, press **Y**.
4. At the **Enter Keys** prompts, enter your encryption key. The encryption keys are entered in hexadecimal. The hexadecimal values are echoed as asterisks to prevent onlookers from seeing the key. Hexadecimal values are 0-9 and A-F.
   - For a 128-bit key length, enter 32 hexadecimal characters.
   - For a 192-bit key length, enter 48 hexadecimal characters.
   - For a 256-bit key length, enter 64 hexadecimal characters
5. Continue pressing **Enter** until you return to the Change Setup menu.
6. At the Change Setup menu, select option **9** to save and exit.

Encryption only applies to the port selected for data tunneling (default 10001), regardless of whether you are using TCP or UDP.

Generally, one of these situations applies:

- Encrypted SDS-to-SDS communication. Be sure to configure both SDS devices with the same encryption key.
- Third-party application to SDS-encrypted communication: SDS uses standard AES encryption protocols. To communicate successfully, products and applications on the peer side must use the same protocols and the same encryption key as the SDS. Developers can license the Lantronix Encryption Library suite.
- Lantronix Secure Com Port Redirector provides an encrypted connection from Windows-based applications to the SDS. A 30-day trial version of SCPR is included on the CD.

NOTE: *For more information about the Lantronix Encryption Library Suite and SCPR see www.lantronix.com/device-networking/utilities-tools/.*

Default Settings (Option 7)

Select **7** to reset the unit's Channel 1 configuration and expert settings to the default settings. The server configuration settings for IP address, gateway IP address, and netmask remain unchanged. The configurable pins' settings also remain unchanged. The specific settings that this option changes are listed below:

Channel 1 Configuration Defaults

Baudrate	9600
I/F Mode	4C (1 stop bit, no parity, 8 bit, RS-232C)
Own TCP port number	10001
Connect Mode	C0 (always accept incoming connection; no active connection startup)
Hostlist retry counter	3
Hostlist retry timeout	250 (msec)
Start character for serial channel 1	0x0D (CR)
All other parameters	0

Channel 2 Configuration Defaults (SDS2101 only)

Baudrate	9600
I/F Mode	4C (1 stop bit, no parity, 8 bit, RS-232C)
Own TCP port number	10002
Connect Mode	C0 (always accept incoming connection; no active connection startup)
Hostlist retry counter	3
Hostlist retry timeout	250 (msec)
Start character for serial channel 2	0x0D (CR)
All other parameters	0

Expert Settings Defaults

TCP Keepalive time in s	45
ARP Cache timeout in s	600
Disable Monitor Mode @ bootup	No
HTTP Port Number	80

(1-65535)	
MTU Size (512 – 1400)	0 (resulting in an operational value of 1400)
Enable alternate MAC	No (for OEM use only)
Ethernet Connection Type	0 (auto-negotiate)

Security Settings Defaults

Disable SNMP	No
SNMP community name	public
Disable Telnet setup	No
Disable TFTP Firmware Update	No
Disable Port 77FEh	No
Disable Web Server	No
Disable Web Setup	No
Disable ECHO ports	Yes
Enable Encryption	No
Enable Enhanced Password	No

9: Firmware Upgrades

Obtaining Firmware

You can obtain the most up-to-date firmware and release notes for the unit from the Lantronix web site (www.lantronix.com) or by using anonymous FTP (ftp.lantronix.com).

Reloading Firmware

There are several ways to update the unit's internal operational code (*.ROM): using DeviceInstaller (the preferred way), using TFTP, or using the serial port. You can also update the unit's internal Web interface (*.COB) using TFTP or DeviceInstaller.

Here are *typical* names for those files. Check the Lantronix web site for the latest versions and release notes.

Table 9-1. Firmware Files

ROM File	COB
SDS1101_6102.rom	SDS1101_webm_1404.cob
SDS2101_6500.rom	SDS2101_webm_1600.cob

Please refer to the DeviceInstaller online Help for information about reloading firmware using DeviceInstaller. The other methods are discussed below.

Using TFTP: Graphical User Interface

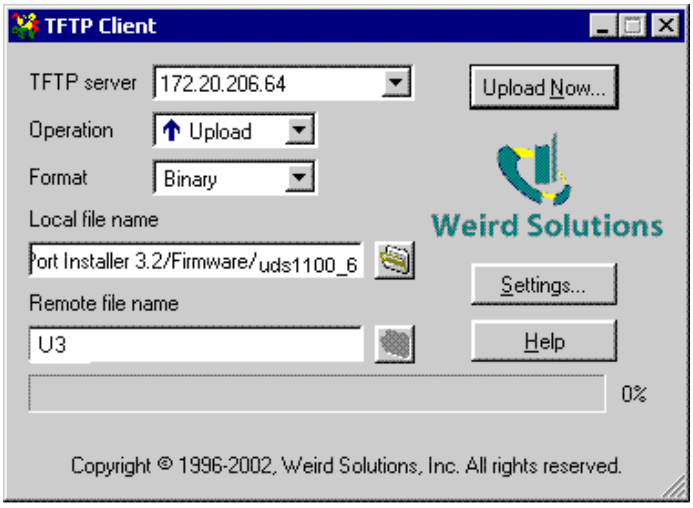
To download new firmware from a computer:

1. Use a TFTP client to send a binary file to the unit (*.ROM to upgrade the unit's internal operational code and *.COB to upgrade its internal Web interface).

   Note: *TFTP requires the .ROM (binary) version of the unit's internal operational code.*

2. In the **TFTP server** field, enter the IP address of the unit being upgraded.
3. Select **Upload** operation and **Binary** format.
4. Enter the full path of the firmware file in the **Local file name** field.
5. In the **Remote file name** field, enter the current internal operational code (**D3** for SDS1101 or **D4** for SDS2101) or **WEB1** for the internal Web interface.
6. Click the **Upload Now** button to transfer the file to the unit.

Figure 9-1. TFTP Window



After the firmware has been loaded and stored (approximately 8 seconds to complete) the unit performs a power reset.

Using TFTP: Command Line Interface

To download new firmware from a computer, enter the following from a TFTP command line interface:

tftp –i <ip address> put <local filename> <destination file name>

The following examples demonstrate the TFTP command sequence to download the .rom file and the .cob file:

SDS1101

tftp –i 192.168.1.111 put SDS1101_6102.rom D3

tftp –i 192.168.1.111 put SDS1101_webm_1404.cob WEB1

SDS2101

tftp –i 192.168.1.121 put SDS2101_6500.rom D4

tftp –i 192.168.1.121 put SDS2101_webm_1600.cob WEB1

Recovering the Firmware Using the Serial Port and DeviceInstaller

If for some reason the firmware is damaged, you can recover the firmware file by using DeviceInstaller to download the *.ROM file over the serial port.

To recover firmware:

1. Start DeviceInstaller. If your PC has more than one network adapter, a message displays. Select an adapter and click **OK**.

2. From the **Tools** menu, select **Advanced/Recover Firmware**. The Serial Port Firmware Upgrade window displays.

3. For **Port on PC**, enter the COM port on the PC that is connected to the serial port of the Lantronix unit.

4. For **Device Model**, be sure the appropriate device (e.g. SDS1101) displays.

5. For **Firmware File**, click the **Browse** button and go to the location where the firmware file resides.

***Note**: Make sure the SDS1101/2101 on which you are recovering firmware is connected to this selected port on your PC.*

6. Click **OK** to download the file.

7. When prompted, reset the device. Status messages and a progress bar at the bottom of the screen show the progress of the file transfer. When the file transfer completes, the message "**Successful, Click OK to Close**" displays.

8. Click the **OK** button to complete this procedure.

10: Monitor Mode

Monitor Mode is a command-line interface used for diagnostic purposes.

There are two ways to enter Monitor Mode: locally using the serial port or remotely using the network.

Entering Monitor Mode Using the Serial Port

To enter Monitor Mode locally:

1. Follow the same steps used for setting the serial configuration parameters (see *Serial Port*).
2. Instead of typing three **x** keys, however:
   a) Type **zzz** (or **xx1**) to enter Monitor Mode with network connections.
   b) Type **yyy** (or **yy1**) to enter Monitor Mode without network connections.

A **0>** prompt indicates that you have successfully entered Monitor Mode.

Entering Monitor Mode Using the Network Port

To enter Monitor Mode using a Telnet connection:

1. Establish a Telnet session to the configuration port (9999). The following is an example of the message that appears:

```
MAC address 00204A9C6B1C
Software version V6.5.0.0 (070402)
AES library version 1.8.2.1

Press Enter for Setup Mode
```

2. Type **M** (upper case) immediately.

   A 0**>** prompt indicates that you have successfully entered Monitor Mode.

Monitor Mode Commands

The following commands are available in Monitor Mode. Many commands have an IP address as an optional parameter (xxx.xxx.xxx.xxx). If you enter the IP address, the command is applied to another unit with that IP address. If you do not enter the IP address, the command is executed locally.

Note: *All commands must be in capital letters. Responses to some of the commands are in Intel Hex format.*

Table 10-1. Monitor Mode Commands

Command	Command Name	Function
VS x.x.x.x	Version	Queries software header record (16 bytes) of unit with IP address x.x.x.x.
GC x.x.x.x	Get Configuration	Gets configuration of unit with IP address x.x.x.x as hex records (120 bytes).
SC x.x.x.x	Send Configuration	Sets configuration of unit with IP address x.x.x.x from hex records.
PI x.x.x.x	Ping	Pings unit with IP address x.x.x.x to check device status.
AT	ARP Table	Shows the unit's ARP table entries.
TT	TCP Connection Table	Shows all incoming and outgoing TCP connections.
NC	Network Connection	Shows the unit's IP configuration.
RS	Reset	Resets the unit's power.
QU	Quit	Exits diagnostics mode.
G0, G1, ...,Ge, Gf	Get configuration from memory page	Gets a memory page of configuration information from the device.
S0, S1,...,Se, Sf	Set configuration to memory page	Sets a memory page of configuration information on the device.
GM	Get MAC address	Shows the unit's 6-byte MAC address.
SS	Set Security record	Sets the Security record without the encryption key and length parameters. The entire record must still be written, but the encryption-specific bytes do not need to be provided (they can be null since they are not overwritten).
NS	Network Status	Reports the network interfaces' statuses. Includes potentially negotiated parameters like speed/duplex for Ethernet or BSSID, encryption, authentication for wireless interfaces.

Note: *Entering any of the commands listed above generates one of the following command response codes:*

Table 10-2. Command Response Codes

Response	Meaning
0>	OK; no error
1>	No answer from remote device
2>	Cannot reach remote device or no answer
8>	Wrong parameter(s)
9>	Invalid command

11: Troubleshooting and Contact Information

This chapter discusses how you can diagnose and fix errors quickly without having to contact a dealer or Lantronix. It helps to connect a terminal to the serial port while diagnosing an error to view summary messages that may display. When troubleshooting, always ensure that the physical connections (power cable, network cable, and serial cable) are secure.

Note: *Some unexplained errors might be caused by duplicate IP addresses on the network. Make sure that your unit's IP address is unique.*

When troubleshooting the following problems, make sure that the SDS is powered up. Confirm that you are using a good network connection.

SDS1101 LEDs

The SDS1101 has the following LEDs, which help you diagnose problems.

- Power LED (green)
- Ethernet 10/100 Link (yellow = 10 Mb/green = 100 Mb)
- Ethernet Half/Full Duplex Activity (yellow = Half Duplex/green = Full Duplex)
- Diagnostic (red)
- Status (green)

Simultaneously lit Diagnostic (red) and Status (green) LEDs mean something is wrong. If the Diagnostic LED is lit or blinking, count the number of times the Status LED blinks between its pauses. The following table explains the LED functions:

Table 11-1. SDS1101 LEDs

Condition	Diagnostic LED	Channel 1 Status LED
No Errors	OFF	N/A
Network controller error	ON	Blinks 3x/4 seconds
Serial number storage checksum error	ON	Blinks 4x/4 seconds
Duplicate IP address present	ON	Blinks 5x/4 seconds
No DHCP response	Blinks 2x/second	Blinks 5x/4 seconds
Setup menu active	Blinks 2x/second	Follows Diagnostic LED for 2 seconds, off for 2 seconds

SDS2101 LEDs

The following LEDs are on the top of the SDS2101:

- Power / Diagnostic (Blue)
- RX Serial 1 Activity LED (Green)
- TX Serial 1 Activity LED (Yellow)
- RX Serial 2 Activity LED (Green)
- TX Serial 2 Activity LED (Yellow)

The following LEDs are on the RJ45 Ethernet connector:

- Ethernet Link LED on the left (Bi-color, 10Mbps = Yellow, 100 Mbps = Green)

Ethernet Activities LED on the right (Bi-color, Half Duplex = Yellow, Full Duplex = Green)

Table 11-2. SDS2101 LEDs

LEDs	Meaning
Power/Diagnostic (Blue)	Steady On = Power OK Blinking 2x = No DHCP response Blinking 2x = Setup Menu active
RX Serial 1 Activity LED (Green)	Off = No data activity Blinking = Data being received by SDS2101 on channel 1
TX Serial 1 Activity LED (Yellow)	Off = No data activity Blinking = data being transmitted from SDS2101 on channel 1
RX Serial 2 Activity LED (Green)	Off = No data activity Blinking = data being received by SDS2101 on channel 2
TX Serial 2 Activity LED (Yellow)	Off = No data activity Blinking = Data being transmitted from SDS2101 on channel 2
Ethernet Link LED on the left (Bi-color)	Off = No Ethernet link established Solid Yellow = 10Mbps Ethernet link established Solid Green = 100 Mbps Ethernet Link established
Ethernet Activity LED on the right (Bi-color)	Off = No data activity Blinking Yellow = Half Duplex data activity Blinking Green = Full Duplex data activity

Problems and Error Messages

Table 11-3. Problems and Error Messages

Problem/Message	Reason	Solution
When you issue the ARP –S command in Windows, the "ARP entry addition failed: 5" message displays.	Your currently logged-in user does not have the correct rights to use this command on this PC.	Have someone from your IT department log you in with sufficient rights.

Problem/Message	Reason	Solution
When you attempt to assign an IP address to the unit by the ARP method, the "Press Enter to go into Setup Mode" error "(described below) message displays. Now when you Telnet to the device server, the connection fails.	When you Telnet to port 1 on the device server, you are only assigning a temporary IP address. When you Telnet into port 9999 and do not press Enter quickly, the device server reboots, causing it to lose the IP address.	Telnet back to Port 1. Wait for it to fail, then Telnet to port 9999 again. Make sure you press Enter quickly.
When you Telnet to port 9999, the "Press Enter to go into Setup Mode" message displays. However, nothing happens when you press Enter, or your connection is closed.	You did not press Enter quickly enough. You only have 5 seconds to press Enter before the connection is closed.	Telnet to port 9999 again, but press Enter as soon as you see the "Press Enter to go into Setup Mode" message.
When you Telnet to port 1 to assign an IP address to the device server, the Telnet window does not respond for a long time.	You may have entered the Ethernet address incorrectly with the ARP command.	Confirm that the Ethernet address that you entered with the ARP command is correct. The Ethernet address may only include numbers 0-9 and letters A-F. In Windows and usually in Unix, the segments of the Ethernet address are separated by dashes. In some forms of Unix, the Ethernet address is segmented with colons.
	The IP address you are trying to assign is not on your logical subnet.	Confirm that your PC has an IP address and that it is in the same logical subnet that you are trying to assign to the device server.
	The device server may not be plugged into the network properly.	Make sure that the Link LED is lit. If the Link LED is not lit, then the device server is not properly plugged into the network.
When you try to assign an IP with DeviceInstaller, you get the following : "No response from device! Verify the IP, Hardware Address and Network Class. Please try again."	The cause is most likely one of the following: The hardware address you specified is incorrect. The IP address you are trying to assign is not a valid IP for your logical subnet. You did not choose the correct subnet mask.	Double-check the parameters that you specified. Note: You cannot assign an IP address to a device server through a router.
The device server is not communicating with the serial device to which it is attached.	The most likely reason is the wrong serial settings were chosen.	The serial settings for the serial device and the device server must match. The default serial settings for the device server are RS-232, 9600 baud, 8 character bits, no parity, 1 stop bit, no flow control.

Problem/Message	Reason	Solution
When you try to enter the setup mode on the device server using the serial port, you get no response.	The issue is most likely something covered in the previous problem, or possibly, you have Caps Lock on.	Double-check everything in the problem above. Confirm that Caps Lock is not on.
You can ping the device server, but not Telnet to the device server on port 9999.	There may be an IP address conflict on your network You are not Telneting to port 9999. The Telnet configuration port (9999) is disabled within the device server security settings.	Turn the device server off and then issue the following commands at the DOS prompt of your computer: ARP -D X.X.X.X (X.X.X.X is the IP of the device server). PING X.X.X.X (X.X.X.X is the IP of the device server). If you get a response, then there is a duplicate IP address on the network. If you do not get a response, use the serial port to verify that Telnet is not disabled.
With DeviceInstaller, you get the *Wrong Password* error when you try to upgrade the firmware.	The file you are attempting to load is the incorrect firmware file for the SDS.	Download the correct firmware file from the Lantronix website.
The device server appears to be set up correctly, but you are not communicating with your device attached to the device server across the network.	If you are sure that the serial port setting is correct, then you may not be connecting to the correct socket of the device server. Another possibility is that the device server is not set up correctly to make a good socket connection to the network.	On SDS1101 you can check to see whether there is a socket connection to or from the SDS by looking at the Status LED. If the Status LED is blinking consistently, then there is a good socket connection. For SDS1101/2101, use the Connect Mode option C0 for making a connection to the SDS from the network. Use Connect Mode option C1 or C5 for a connection to the network from the SDS.
When connecting to the Web-Manager within the device server, the "No Connection With The Device Server" message displays.	Your computer is not able to connect to port 30718 (77FEh) on the device server.	Make sure that port 30718 (77FEh) is not blocked with any router that you are using on the network. Also, make sure that port 77FEh is not disabled within the Security settings of the device server.

Technical Support

If you are experiencing an error that is not described in this chapter, or if you are unable to fix the error, you have the following options:

To check our online knowledge base or send a question to Technical Support, go to http://www.lantronix.com/support.

Technical Support Europe, Middle East, and Africa
Phone: +33 (0) 1 39 30 41 72
Email: eu_techsupp@lantronix.com or eu_support@lantronix.com

Firmware downloads, FAQs, and the most up-to-date documentation are available at: www.lantronix.com/support

When you report a problem, please provide the following information:

- Your name, and your company name, address, and phone number
- Lantronix model number
- Lantronix MAC number
- Software version (on the first screen shown when you Telnet to port 9999)
- Description of the problem

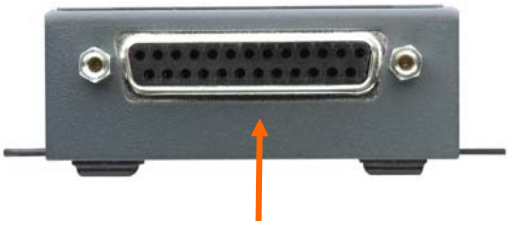
Status of the unit when the problem occurred (please try to include information on user and network activity at the time of the problem)

12: SDS1101 Connections and Pinouts

Serial Port

The SDS1101 has a female DCE DB25 serial port that supports RS-232 and RS-485/422 serial standards (software selectable) up to 230 Kbaud.

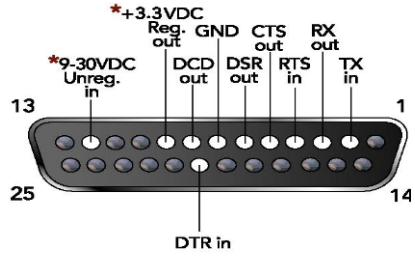
Figure 12-1. Serial Interface



Serial Connector Pinouts

The unit's female DB25 connector provides an RS-232C, RS-485, or RS-422 DCE serial port. The default serial port settings are 9600 baud, 8 bits, no parity, and 1 stop bit.

Figure 12-2. DB25 Female DCE Interface RS232



DB25 Female DCE Interface RS232

*Optional power connection

Figure 12-3. DB25 Female Interface RS422 (4 wire mode)

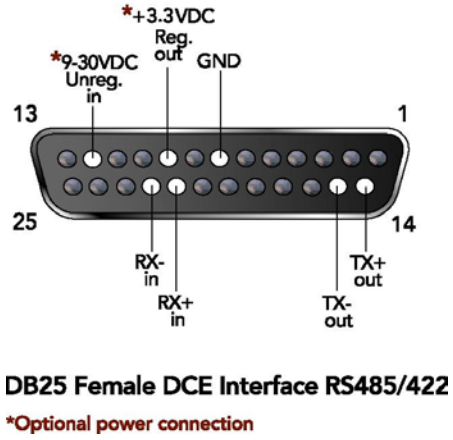
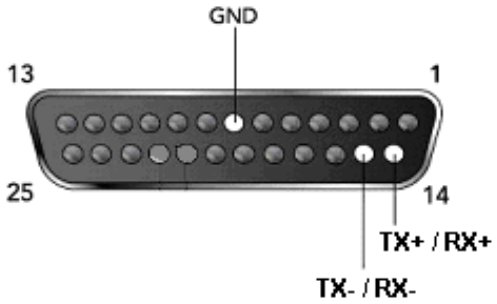


Figure 12-4. DB25 Female Interface RS485 (2 wire mode)

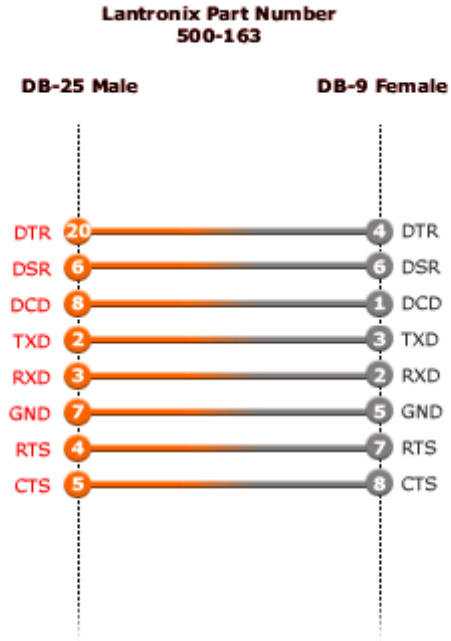


Modem Cable

When attaching the DB25 of the SDS1101 to the DB9 com port on a PC, use a standard straight-through serial cable. The figure below shows the pinouts for a DB25 to DB9 straight-through cable, often referred to as a "Modem Cable".

To configure the SDS using the DB9 serial port, you need only pin out the TXD, RXD, and GND signals.

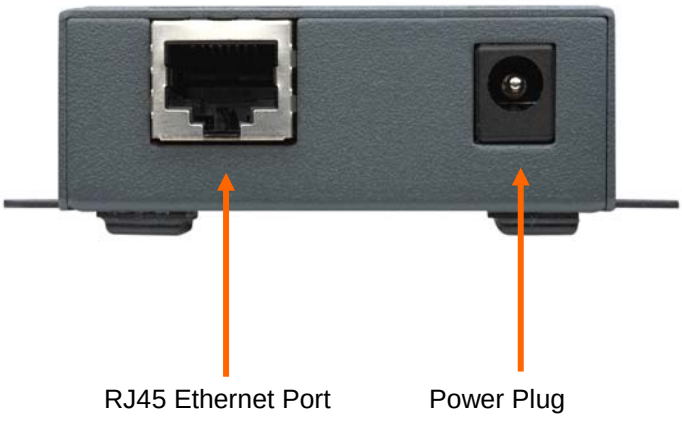
Figure 12-5. Modem Cable



Network Port

The unit's back panel contains a power plug and an RJ45 (10/100) Ethernet port.

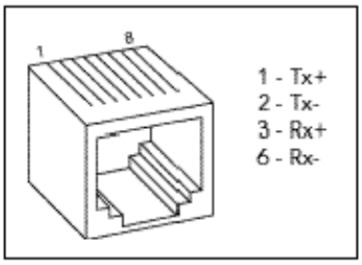
Figure 12-6. Network Interface



Ethernet Connector Pinouts

The SDS1101 supports 10/100 Mbps half or full duplex Ethernet through an RJ45 connector.

Figure 12-7. RJ45 Ethernet Connector



Power Plug

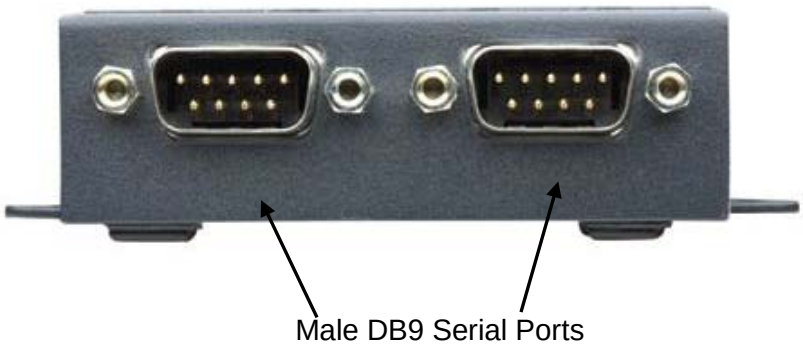
Power input on the power plug is 9 -30 VDC (center +) or 10-24 VAC (1.5W maximum power required).

13: SDS2101 Connections and Pinouts

SDS2101 Serial Ports

The SDS2101 has two male DB9 DTE serial ports that support RS-232C/RS-422 (4-wire)/RS-485 (2-wire) serial standards up to 230 Kbps (and up to 921 Kbps if high performance is selected).

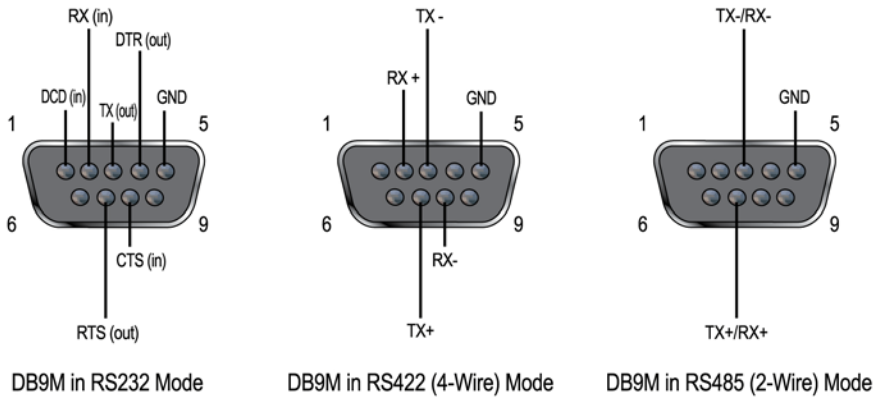
Figure 13-1. Serial Interface



Serial Connector Pinouts

The two Male DB9 DTE connectors provide an RS-232C/RS-422 (4-wire)/ RS-485 (2-wire) interface. The default serial port settings are 9600 baud, 8 bits, no parity, 1 stop bit, no flow control.

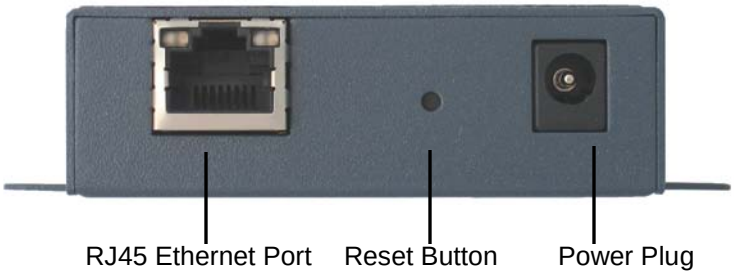
Figure 13-2. DB9 Male RS232 Serial DTE Connector



Network Port

The unit's back panel contains a 9-30VDC power plug and an RJ45 (10/100) Ethernet port.

Figure 13-3. Network Interface



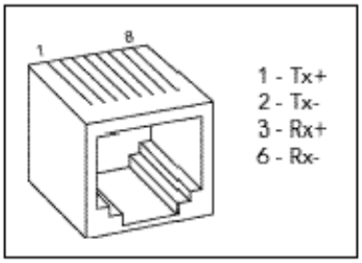
Reset Button

You can reset the unit to factory defaults, including clearing the network settings (IP address, gateway, and netmask are set to 00s).

To reset the unit to factory defaults:

1. Place the end of a paper clip or similar object into the reset opening and press for a minimum of 3 seconds.
2. Release the button and remove the paper clip. The firmware restores factory default settings to the configuration and invokes a reset (internally).

Ethernet Connector Pinouts



Power Plug

Power input on the power plug is 9-30 VDC (center +) (1.8W maximum power).

14: SDS1101 Technical Specifications

Table 14-1. SDS1101 Technical Specifications

Category	Description
CPU	Lantronix DSTNI-EX 48 MHz clock
Internal CPU Memory	256 KB zero wait state SRAM
Flash	2 MB Flash
EEPROM	2 KB EEPROM
Serial Interface	1 DB25F DCE serial port Software-selectable baud rate from 300 to 230 KBaud Software-selectable RS232, RS422 or RS485 (2 and 4 wire support)
Serial Line Formats	Characters: 7 or 8 data bits Stop bits: 1 or 2 Parity: odd, even, none
Modem Control	DTR, DSR
Flow Control	Hardware: CTS/RTS Software: XON/XOFF
Power Input	9-30 VDC or 9-24 VAC on barrel connector (1.5 Watts maximum consumption) 9-30 VDC on DB25F serial interface
Network Interface	1 RJ45 10Base-T/100Base-TX Ethernet port Software selectable Ethernet speed 10/100/Auto Software selectable Half/Full/Auto duplex
Dimensions	Height: 2.3 cm (0.9 in) Width: 6.4 cm (2.5 in) Depth: 9.0 cm (3.5 in)
Weight	0.20 kg (0.45 lb)
Temperature	Operating range: 0° to 60° C (32° to 140° F) **Note:** Operating range for SDS1101-IAP only: -40° to 70° C (-40° to 158° F) Storage -40° to 85° C (-40 to 185° F)
Relative Humidity	Operating 10% to 90% non-condensing, 40% to 60% recommended Storage 10% to 90% non-condensing
Case	Metal enclosure with integrated wall mounts Optional 35 mm Din Rail mount available
Protocols Supported	ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP, DHCP, BOOTP, TFTP, and HTTP
Installable Industrial Protocols	ModBus TCP, ModBus ASCII/RTU, DF1 Multi-Master (IAP version only)
Management	Internal web server SNMP (read only) Serial login

Category	Description
	Telnet login DeviceInstaller software
System Software	DeviceInstaller, Windows® 95/98/ME/NT/2000/XP-based configuration software Com Port Redirector, Windows® 98/NT/2000/XP-based virtual com port software
LEDs	Power 10/100 Mb Link 10/100 Activity Diagnostic Status
Emissions	FCC Part 15 Subpart B Class A — Radiated Emissions 30MHz – 1000MHz ICES-003 Issue 4 February 2004 Class A — Radiated Emissions 30MHz – 1000MHz AS/NZS CISPR 22: 2004 Class A — Radiated Emissions 30MHz – 1000MHz EN55022: 1998 + A1: 2000 + A2: 2003 Class A — Radiated Emissions 30MHz – 1000MHz VCCI V-3/2005.04 Class A — Radiated Emissions 30MHz – 1000MHz EN61000-3-2: 2000 Class A — Harmonic Current Emissions EN61000-3-3: 1995 + A1: 2001 — Fluctuations and Flicker
Immunity	EN55024: 1998 +A1: 2001 +A2: 2003 IEC_61000-4-2: 1995 — ESD 8KV Air Discharge (Direct), 4KV Contact Discharge (Direct/Indirect) IEC_61000-4-3: 1995 — Radiated Immunity 3.0V/m, 1KHz AM Sine Wave at 80% IEC_61000-4-4: 1995 — EFT/Burst 1.0KV Power Lines, 0.5KV I/O Lines IEC_61000-4-5: 1995 — Surge Immunity 1.0KV Common Mode, 1.0 KV Differential Mode IEC_61000-4-6: 1996 — Conducted Immunity 3.0 Vrms, 80% AM Modulated (1KHz) IEC_61000-4-8: 1993 — Magnetic Field Immunity 50Hz 1.0 Arms/m IEC_61000-4-11: 1994 — Voltage Dips and Interrupts (>95%, 0.5 periods), (30%, 25 periods), (>95%, 250 periods)
Isolation	Designed with protections against transients and ESD for use under harsh environments Serial Port: 15 KV ESD protection on RS232 and RS422/485 transceivers Power Input: Up to non-repeated 600 W 10/100 usec pulse protection against transient over voltages Ethernet Port: 1500 VAC isolation shielded with shield connected to chassis ground for signal integrity and ESD protection
Agency Approvals	UL, CSA, FCC, CE, TUV, CTick, VCCI

15: SDS2101 Technical Specifications

Table 15-1. SDS2101 Technical Specifications

Category	Description
CPU	Lantronix DSTNI-EX 48 MHz clock
Internal CPU Memory	256 KB zero wait state SRAM
Flash	2 MB Flash
EEPROM	2 KB EEPROM
Serial Interface	2 DB9M DTE serial ports Software-selectable baud rate from 300 to 921K baud (when High Performance is selected) Software-selectable RS232, RS422 or RS485 (2 and 4 wire support)
Serial Line Formats	Characters: 7 or 8 data bits Stop bits: 1 or 2 Parity: odd, even, none
Modem Control	DTR, Modem Control In
Flow Control	Hardware: CTS/RTS Software: XON/XOFF
Power Input	9-30 VDC on barrel connector (1.8W maximum consumption)
Network Interface	1 RJ45 10Base-T/100Base-TX Ethernet port Software selectable Ethernet speed 10/100/Auto Software selectable Half/Full/Auto duplex
Dimensions	Height: 2.3 cm (0.9 in) Width: 7.3 cm (2. 9 in) Length : 9.5 cm (3.75 in)
Weight	0.26 kg (0.6 lb)
Temperature	Operating range: 0° to 60° C (32° to 140° F) ***Note**: Operating range for SDS2101-IAP only: -40° to 70° C (-40° to 158° F)* Storage -40° to 85° C (-40 to 185° F)
Relative Humidity	Operating 10% to 90% non-condensing, 40% to 60% recommended Storage 10% to 90% non-condensing
Case	Metal enclosure with integrated wall mounts Optional 35 mm Din Rail mount available
Protocols Supported	ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP, DHCP, BOOTP, TFTP, and HTTP

Category	Description
Installable Industrial Protocols	ModBus TCP, ModBus ASCII/RTU, DF1 Multi-Master (IAP version only)
Management	Internal web server SNMP (read only) Serial login Telnet login DeviceInstaller software
System Software	DeviceInstaller, Windows® 95/98/ME/NT/2000/XP-based configuration software Com Port Redirector, Windows® 98/NT/2000/XP-based virtual com port software
LEDs	Power 10/100 Mb Link on RJ45 10/100 Activity on RJ45 Diagnostic RX Serial 1 Activity TX Serial 1 Activity RX Serial 2 Activity TX Serial 2 Activity
Emissions	FCC Part 15 Subpart B Class A Radiated Emissions 30MHz – 1000MHz ICES-003 Issue 4 February 2004 Class A Radiated Emissions 30MHz – 1000MHz AS/NZS CISPR 22:2006 Class A Radiated Emissions 30MHz – 1000MHz EN55022: 1998 + A1: 2000 + A2: 2003 Class A Radiated Emissions 30MHz – 1000MHz VCCI V-3/2006.04 Class A Radiated Emissions 30MHz – 1000MHz EN61000-3-2: 2000 Class A Harmonic Current Emissions EN61000-3-3: 1995 + A1: 2001 Fluctuations and Flicker
Immunity	EN55024: 1998 +A1: 2001 +A2: 2003 IEC_61000-4-2: 1995 ESD 8KV Air Discharge (Direct), 4KV Contact Discharge (Direct/Indirect) IEC_61000-4-3: 1995 Radiated Immunity 3.0V/m, 1KHz AM Sine Wave at 80% IEC_61000-4-4: 1995 EFT/Burst 1.0KV Power Lines, 0.5KV I/O Lines IEC_61000-4-5: 1995 Surge Immunity 1.0KV Common Mode, 1.0 KV Differential Mode IEC_61000-4-6: 1996 Conducted Immunity 3.0 Vrms, 80% AM Modulated (1KHz) IEC_61000-4-8: 1993 Magnetic Field Immunity 50Hz 1.0 Arms/m IEC_61000-4-11: 1994 Voltage Dips and Interrupts (>95%, 0.5 periods), (30%, 25 periods), (>95%, 250 periods)
Isolation	Designed with protections against transients and ESD for use under harsh environments Serial Port: 15 KV ESD protection on RS232 and RS422/485 transceivers Power Input: Up to non-repeated 600 W 10/100 usec pulse protection against

Category	Description
	transient over voltages Ethernet Port: 1500 VAC isolation shielded with shield connected to chassis ground for signal integrity and ESD protection
Agency Approvals	UL, CSA, FCC, CE, TUV, CTick, VCCI

A: Alternative Ways to Assign an IP Address

Earlier chapters describe how to assign a static IP address using DeviceInstaller, Web Manager, and Setup Mode (through a Telnet or serial connection). This section covers other methods for assigning an IP address over the network.

DHCP

The unit ships with a default IP address of 0.0.0.0, which automatically enables DHCP. If a DHCP server exists on the network, it provides the unit with an IP address, gateway address, and subnet mask when the unit boots up.

You can use the DeviceInstaller software to search the network for the DHCP-assigned IP address and add it to the list of devices retrieved.

Note: *This DHCP address does **not** appear in the unit's Setup Mode or in Web Manager. You can determine your unit's DHCP-assigned IP address in Monitor Mode. When you enter Monitor Mode from the serial port with network connection enabled and issue the **NC** (Network Communication) command, you see the unit's IP configuration.*

AutoIP

The unit ships with a default IP address of 0.0.0.0, which automatically enables Auto IP within the unit. AutoIP is an alternative to DHCP that allows hosts to obtain an IP address automatically in smaller networks that may not have a DHCP server. A range of IP addresses (from 169.254.0.1 to 169.254.255.1) has been explicitly reserved for AutoIP-enabled devices. Do not use this range of Auto IP addresses over the Internet.

- If your unit cannot find a DHCP server, and you have not manually assigned an IP address to it, the unit automatically selects an address from the AutoIP reserved range. Then, your unit sends out a (ARP) request to other nodes on the same network to see whether the selected address is being used.
- If the selected address is not in use, then the unit uses it for local subnet communication.
- If another device is using the selected IP address, the unit selects another address from the AutoIP range and reboots. After reboot, the unit sends out another ARP request to see if the selected address is in use, and so on.

AutoIP does not replace DHCP. The unit continues to look for a DHCP server on the network. If it finds a DHCP server, the unit switches to the DHCP server-provided address and reboots.

Note: *If a DHCP server is found, but it denies the request for an IP address, the unit does not attach to the network, but waits and retries.*

AutoIP can be disabled by setting the unit's IP address to 0.0.1.0. This setting enables DHCP but disables AutoIP.

BOOTP

Similar to DHCP, but for smaller networks. Automatically assigns the IP address for a specific duration of time.

ARP and Telnet

If the unit has no IP address, you can use Address Resolution Protocol (ARP) method from UNIX and Windows-based systems to assign a temporary IP address.

To assign a temporary IP address:

1. On a UNIX or Windows-based host, create an entry in the host's ARP table using the intended IP address and the hardware address of the unit (on the product label on the bottom of the unit).

   ```
   arp -s 191.12.3.77 00:20:4a:xx:xx:xx (Unix)

   arp -s 191.12.3.77 00-20-4a-xx-xx-xx (Windows)
   ```

   Note: *For the ARP command to work on Windows 95, the ARP table on the PC must have at least one IP address defined other than its own.*

2. If you are using Windows 95, type `ARP -A` at the DOS command prompt to verify that there is at least one entry in the ARP table. If the local machine is the only entry, ping another IP address on your network to build a new entry in the ARP table; the IP address must be a host other than the machine on which you are working. Once there is at least one additional entry in the ARP table, use the following command to ARP an IP address to the unit:

   ```
   arp -s 191.12.3.77 00-20-4a-xx-xx-xx
   ```

3. Open a Telnet connection to port 1. The connection fails quickly, but the unit temporarily changes its IP address to the one designated in this step.

   telnet 191.12.3.77 1

4. Open a Telnet connection to port 9999, and press **Enter** within **five seconds** to go into Setup Mode. If you wait longer than five seconds, the unit reboots.

   telnet 191.12.3.77 9999

Note: *The IP address you just set is temporary and reverts to the default value when the unit's power is reset, unless you configure the unit with a static IP address and store the changes permanently.*

B: Binary to Hexadecimal Conversions

Many of the unit's configuration procedures require assembling a series of options (represented as bits) into a complete command (represented as a byte). Convert the resulting binary value to a hexadecimal representation.

Converting Binary to Hexadecimal

Following are two simple ways to convert binary numbers to hexadecimals.

Conversion Table

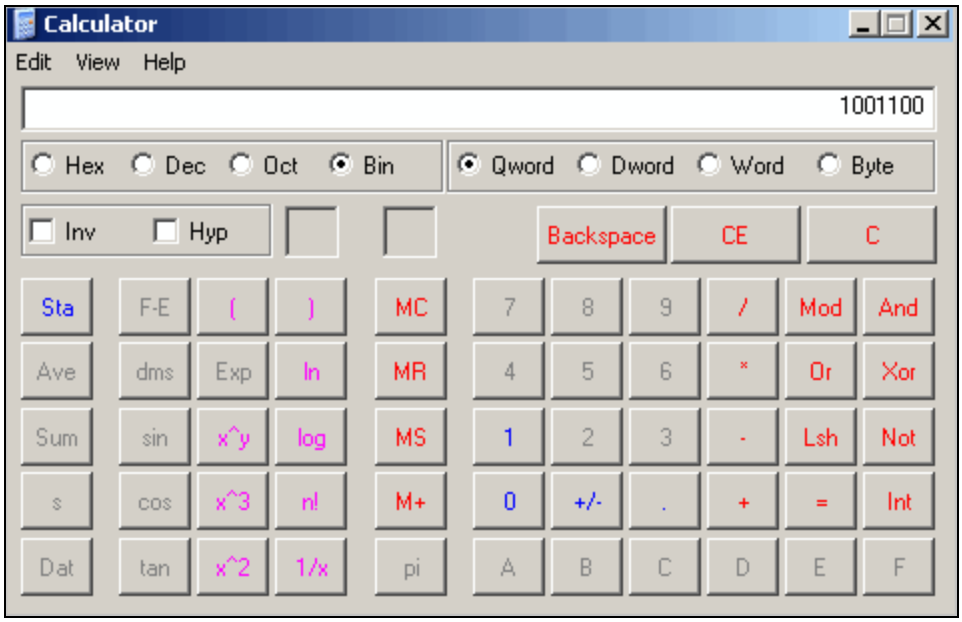
Hexadecimal digits have values ranging from 0 to F, which are represented as 0-9, A (for 10), B (for 11), etc. To convert a binary value (for example, 0100 1100) to a hexadecimal representation, the upper and lower four bits are treated separately, resulting in a two-digit hexadecimal number (in this case, 4C). Use the following table to convert values from binary to hexadecimal.

Decimal	Binary	Hex
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

Scientific Calculator

Another simple way to convert binary to hexadecimals is to use a scientific calculator, such as the one available on Windows' operating systems. For example:

1. On the Windows' Start menu, click **Programs→Accessories→Calculator**.
2. On the **View** menu, select **Scientific**. The scientific calculator displays.
3. Select **Bin** (Binary), and type the number to convert.


Calculator
Edit View Help
1001100
Hex Dec Oct Bin
Qword Dword Word Byte
Inv Hyp
Backspace CE C
Sta F-E ( ) MC 7 8 9 / Mod And
Ave dms Exp ln MR 4 5 6 * Or Xor
Sum sin x^y log MS 1 2 3 - Lsh Not
s cos x^3 n! M+ 0 +/- . + = Int
Dat tan x^2 1/x pi A B C D E F

4. Click **Hex**. The hexadecimal value displays.

C: Warranty

For details on the Lantronix warranty replacement policy, please go to our Web site at www.lantronix.com/support/warranty.

D: Compliance and Disclaimer

Manufacturer's Name & Address

Lantronix

167 Technology Drive
Irvine, CA 92618 USA

Declares that the following product:

Product Name Model: SDS1101 and SDS2101 Device Servers

Conforms to the following standards or other normative documents:

Safety

UL 60950-1
CSA 22.2. No 60950-1-03
EN 60950-1
TUV
VCCI
C-TICK

Electromagnetic Emissions

FCC Part 15 Subpart B Class A
ICES-003 Issue 4 February 2004 Class A
AS/NZS CISPR 22: 2004 Class A
EN55022: 1998 + A1: 2000 + A2: 2003 CLASS A
EN61000-3-2: 2000 Class A
EN61000-3-3: 1995 +A1: 2001
VCCI
V-3/2006.04 Class A (SDS2101 only)

Electromagnetic Immunity

EN55024: 1998 +A1: 2001 +A2: 2003
IEC 61000-4-2: 1995
IEC 61000-4-3: 1995
IEC 61000-4-4: 1995
IEC 61000-4-5: 1995
IEC 61000-4-6: 1996
IEC 61000-4-8: 1993

IEC 61000-4-11: 1994

RoHS Notice

All Lantronix products in the following families are China RoHS-compliant and free of the following hazardous substances and elements:

- Lead (Pb)
- Mercury (Hg)
- Polybrominated biphenyls (PBB)
- Cadmium (Cd)
- Hexavalent Chromium (Cr (VI))
- Polybrominated diphenyl ethers (PBDE)

Product Family Name	Toxic or hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr (VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
UDS1100 and 2100	0	0	0	0	0	0
EDS	0	0	0	0	0	0
MSS100	0	0	0	0	0	0
IntelliBox	0	0	0	0	0	0
XPress DR & XPress-DR+	0	0	0	0	0	0
SecureBox 1101 & 2101	0	0	0	0	0	0
WiBox	0	0	0	0	0	0
UBox	0	0	0	0	0	0
MatchPort	0	0	0	0	0	0
SLC	0	0	0	0	0	0
XPort	0	0	0	0	0	0
WiPort	0	0	0	0	0	0
SLB	0	0	0	0	0	0
SLP	0	0	0	0	0	0
SCS	0	0	0	0	0	0
SLS	0	0	0	0	0	0
DSC	0	0	0	0	0	0

O: toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.
X: toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

Disclaimer and Supplementary Information

This product has been designed to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against such interference when operating in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this guide, may cause harmful interference to radio communications. Operation of this equipment of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at user own expense.

This Class A digital apparatus complies with Canadian ICES-003

Cet appareil num′erique de la classe A est conforme à la norme NMB-003 du Canada.

The product complies with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC.

Encryption: This product includes AES encryption certified by the National Institute of Standard and Technology to FIPS-197 standard certification #120.

Export Control Classification Number 5A002, License exception ENC.

Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device. The information in this guide may change without notice. The manufacturer assumes no responsibility for any errors that may appear in this guide.

Manufacturer's Contact

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